Innominate

User Manual

mGuard

Software Release 7.0

01/2010

Description: UM EN MGUARD 7.0

Revision: 00

Item no.: —

This manual applies to mGuard software release 7.0
when used with the following mGuard devices:

– mGuard centerport
– mGuard industrial RS
– mGuard smart
– mGuard PCI
– mGuard blade
– mGuard delta
– EAGLE mGuard

Please observe the following notes:

In order to use the product described here safely, you must have read and fully understood the manual. The following notes are intended for initial guidance in using the manual.

Target groups

Operation of the product as described in this manual is intended for the following groups only:

– Qualified electricians (or those trained by qualified electricians) who are familiar with applicable electrotechnical regulations and standards and the relevant safety concepts, in particular.
– Qualified application programmers and software engineers who are familiar with the relevant safety concepts for automation technology and the applicable regulations and standards.

Innominate assumes no liability for human errors and damages to Innominate products and third-party products that result from the improper use of the information in this manual.

Explanation of symbols and signal words

This symbol indicates dangers that may lead to personal injury. Observe all instructions indicated by this symbol in order to avoid possible injuries.

DANGER
Indicates a hazardous situation that will lead to personal injury or death if not avoided.

WARNING
Indicates a hazardous situation that can lead to personal injury or death if not avoided.

CAUTION
Indicates a hazardous situation that can lead to personal injury if not avoided.

The following symbols indicate dangers that can lead to material damage, or provide useful operation tips.

ATTENTION
This symbol and the corresponding text warn the user of actions that can lead to damages or malfunctions on the device, device surroundings, hardware or software.

This symbol and the corresponding text provide additional information (e.g. tips and suggestions for efficient operation or optimizing the software). It is also used to refer the operator to further sources of information (manuals, data sheets etc.).

Legal information

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Notes on CE identification

CE

In agreement with the EU directives for the responsible authorities, the conformity declarations are available at the following address:

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FCC Note

This note applies to the following devices:
mGuard industrial RS, mGuard smart, mGuard PCI, mGuard delta, and EAGLE mGuard.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and complies with the limits for a Class A digital device, according to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

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1 Introduction

The mGuard protects IP data connections. In doing this, the device incorporates the following functions:

– Network card (mGuard PCI) and switch (mGuard delta)
– VPN router (VPN – **V**irtual **P**rivate **N**etwork) for the secure transfer of data via public networks (hardware-based DES, 3DES and AES encryption, IPsec protocol).
– Configurable firewall for protection against unauthorized access. The dynamic packet filter inspects data packets using the source and destination addresses and blocks undesired data traffic.

The device can be easily configured using a web browser.

Further information can be found on the Innominate website: www.innominate.com.

Network features

– Stealth (Auto, Static, Multi), Router (Static, DHCP Client), PPPoE (for DSL), PPTP (for DSL) and Modem modes
– VLAN
– DHCP Server / Relay on internal and external network interfaces
– DNS cache on the internal network interface
– Administration via HTTPS and SSH
– Optional rewrite of DSCP / TOS values (Quality of Service values)
– Quality of Service (QoS)
– LLDP
– MAU management
– SNMP

Firewall features

– Stateful Packet Inspection
– Anti-spoofing
– IP filter
– L2 filter (only in Stealth mode)
– NAT with FTP, IRC and PPTP support (only in Router modes)
– 1:1 NAT (only in *Router* network mode)
– Port forwarding (not in *Stealth* network mode)
– Individual firewall rules for different users (user firewall)
– Individual rule records as action (target) of firewall rules (apart from user firewall or VPN firewall)
– Firewall throughput: max. 99 MBit/s

Anti-virus features

– CIFS integrity check of network drives for changes to certain file types (e.g. executable files).
– Antivirus Scan Connector for supporting the central monitoring of network drives with virus scanners.

VPN features

- Protocol: IPsec (Tunnel and Transport mode)
- IPsec encryption in hardware with DES (56 Bit), 3DES (168 Bit), AES (128, 192, 256 Bit)
- Packet authentication: MD5, SHA-1
- Internet Key Exchange (IKE) with Main and Quick mode
- Authentication via
  - Pre-Shared Key (PSK)
  - X.509v3 certificates with Public Key Infrastructure (PKI) with Certification Authority (CA), optional Certificate Revocation List (CRL) and filter options according to subject

  or
  - Remote certificate (e.g. self-signed certificates)
- Recognition of changing remote peer IP addresses via DynDNS
- NAT Traversal (NAT-T)
- Dead Peer Detection (DPD): Recognition of IPsec connection breaks
- IPsec / L2TP server: Connection of IPsec / L2TP clients
- IPsec firewall and 1:1 NAT
- Default route over VPN
- Forwarding of data between VPNs (hub and spoke)
- Depending on the license: up to 250 VPN channels; up to 1000 active VPN channels on mGuard centerport
- VPN throughput of max. 35 MBit/s (266 MHz mGuard) and 70 MBit/s (533 MHz mGuard)

Additional features

- Remote Logging
- Router / Firewall Redundancy (the “Firewall Redundancy” function is not available in firmware version 7.0).
- Administration using SNMP v1-v3 and Innominate Device Manager (IDM)
- PKI support for HTTPS / SSH Remote Access
- Can function as an NTP and DNS server via the LAN interface

Support

Please contact your local dealer if problems occur with the mGuard.

Additional information on the device – plus release notes and software updates – can be found on our website: www.innominate.com.

1.1 Device versions

The **mGuard** is available in the following device versions, which all have largely identical functions. All devices can be utilized regardless of the processor technology or operating system used by the connected computers.

mGuard centerport

The mGuard centerport is available in three different device versions, which differ according to the number of supported, simultaneously active VPN tunnels:
mGuard centerport, mGuard centerport 250, mGuard centerport 1000.

The Innominate mGuard centerport is a 19-inch high-performance firewall / VPN gateway, and is ideally positioned as a central network infrastructure for teleservice solutions. The device is also suitable for use in industrial backbone networks, with its Gigabit Ethernet interface and corresponding throughput as a router and Stateful Inspection Firewall. As a gateway for Virtual Private Networks, the device supports the VPN connection of any number of systems in VPN tunnel groups, with up to 1000 tunnels active at any one time. All of these tunnels are combined under one public IP address. Without distributing the load to multiple interfaces, the device has an encrypted VPN data throughput of over 300 MBit / sec. for secure teleservices such as remote support, remote diagnosis, remote maintenance and condition monitoring of large numbers of systems and machines over the Internet.

The mGuard centerport is equipped with mGuard firmware (version 7.0.0 or higher), which has been fully ported onto its multicore x86 processor architecture. It is also fully compatible with all other mGuard VPN devices and the Innominate Device Manager.

Fig. 1-1 mGuard centerport

mGuard industrial RS

The **mGuard industrial RS** is available in three different device versions:

– With integrated modem
– With integrated ISDN terminal adapter
– Without the modem and terminal adapter

It can then be used as a firewall/VPN router hybrid over Ethernet or dial-up network connections. “RS” indicates that this device is especially suited for secure Remote Services (remote diagnosis, remote configuration, teleservices). The device is designed for assembly on mounting rails (according to DIN EN 60715) and is therefore especially suitable for use in industrial environments.

VPN tunnels can be initiated using the software or hardware switch. Redundant power supplies are supported (9 V DC – 36 V DC).

Fig. 1-2 mGuard industrial RS

mGuard smart

The **mGuard smart** is the smallest device model. It can easily be inserted between the computer or local network (on the mGuard LAN port) and an available router (on mGuard WAN port), without having to change existing system configurations or driver installations. It is designed for instant use in the office or when travelling.

Fig. 1-3 mGuard smart

mGuard PCI

The **mGuard PCI** card can be plugged into a PCI slot and provides the connected computer with all mGuard functions in *Driver mode*. It can also be used as a normal network card.

An existing network card or another computer / network can be connected in *Power-over-PCI mode*.

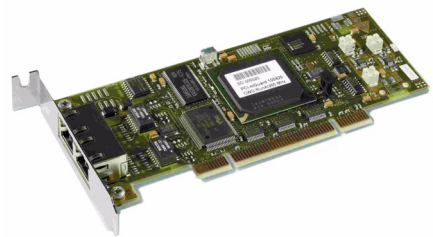


Fig. 1-4 mGuard PCI

mGuard blade

The **mGuard bladePack** includes the mGuard bladeBase. This can be easily installed into standard 3 U racks (19 inch) and can accommodate up to 12 mGuard blades in addition to an mGuard blade controller. This device version is thus ideally suited for use in an industrial environment, where it can protect several server systems individually and independently of each other.

An additional serial port enables remote configuration using a telephone dial-up connection or a terminal.

Fig. 1-5 mGuard blade

EAGLE mGuard

The **EAGLE mGuard** is designed for assembly on mounting rails (according to DIN EN 60715) and is therefore especially suitable for use in industrial environments.

Further application options are provided by the optional configuration connection and the option to establish a telephone dial-up connection via the V.24 interface.

Fig. 1-6 EAGLE mGuard

mGuard delta

The **mGuard delta** is a compact LAN switch (Ethernet / Fast Ethernet) designed for connecting up to 4 LAN segments. This device is especially suited for logically segmented network environments where locally connected computers / networks share mGuard functions.

An additional serial port enables configuration using a telephone dial-up connection or a terminal. The mGuard delta has a robust metal housing, making it suitable as a desktop device or for use in wiring closets.

Fig. 1-7 mGuard delta

2 Typical Application Scenarios

Various possible application scenarios for the mGuard are detailed in this chapter.

– Stealth mode
– Network router
– DMZ
– VPN gateway
– WLAN over VPN
– Solving network conflicts

2.1 Stealth mode

In **Stealth mode**, the mGuard can be installed between an individual computer and the rest of the network.

The settings (e.g. for firewall and VPN) can be made using a web browser under the URL https://1.1.1.1/.

No configuration changes are required on the computer itself.

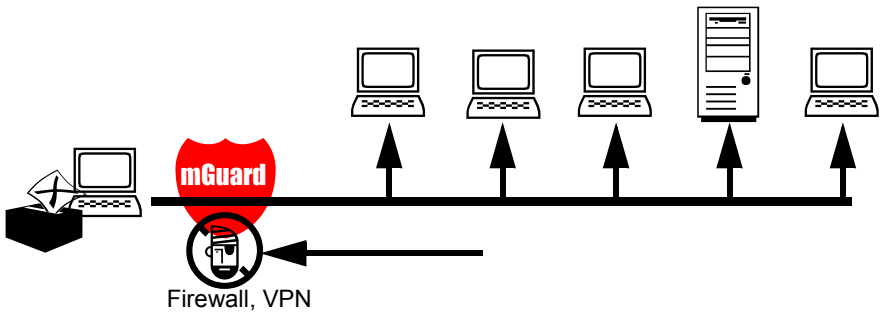


Fig. 2-1 Stealth mode

2.2 Network router

The mGuard can provide an Internet connection for multiple computers as a **network router** whilst protecting the company network using the firewall.

One of the following network modes of the mGuard may be used here:

– *Router*, if Internet access is established via a DSL router or dedicated line, for example.
– *PPPoE*, if Internet access is established, for example, via a DSL modem using the PPPoE protocol (e.g. in Germany).
– *PPTP*, if Internet access is established, for example, via a DSL modem using the PPTP protocol (e.g. in Austria).
– *Modem*, if Internet access is established via a serial connected modem (compatible with Hayes or AT instruction sets).

The mGuard must be set as the default gateway on computers placed in the Intranet.

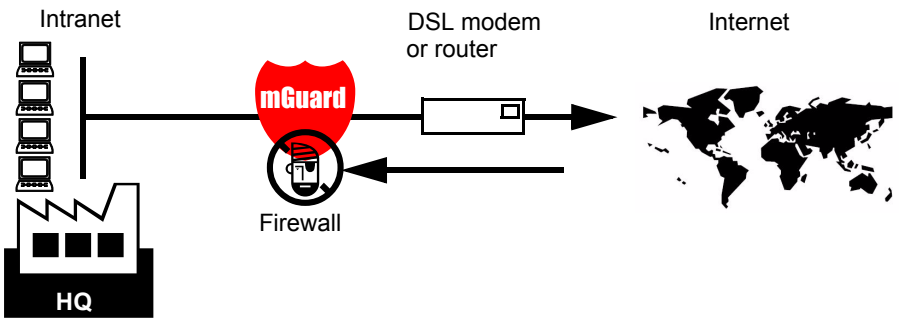


Fig. 2-2 Network router

2.3 DMZ

A **DMZ** (Demilitarized Zone) is a protected network that sits between two other networks. For example, a company website may be inside a DMZ, granting FTP write access only to computers in the Intranet and HTTP read-only access to both networks (i.e. also over the Internet).

IP addresses within a DMZ can be public or private. In the latter case, the mGuard connected to the Internet forwards the connections using “port forwarding” to the private addresses within the DMZ.

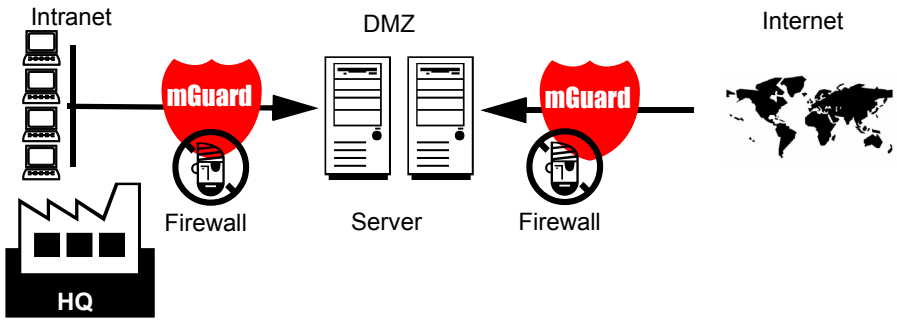


Fig. 2-3 DMZ

2.4 VPN gateway

By using the **VPN gateway**, encrypted access to the company network is provided to employees at home or whilst travelling. The mGuard thereby takes on the role of the VPN gateway.

On external computers, IPsec-capable VPN client software must be installed and the operating system must support this function (e.g. Windows 2000/XP), or an mGuard must be installed on the computer.

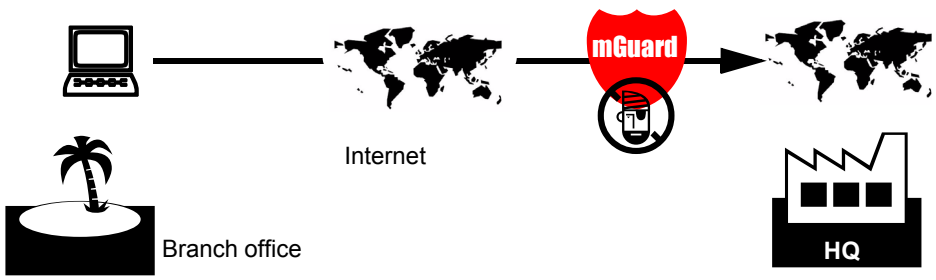


Fig. 2-4 VPN gateway

2.5 WLAN over VPN

With **WLAN over VPN**, two company buildings are connected to each other over an IPsec-protected WLAN connection. The auxiliary building should also be able to use the Internet connection of the main building.

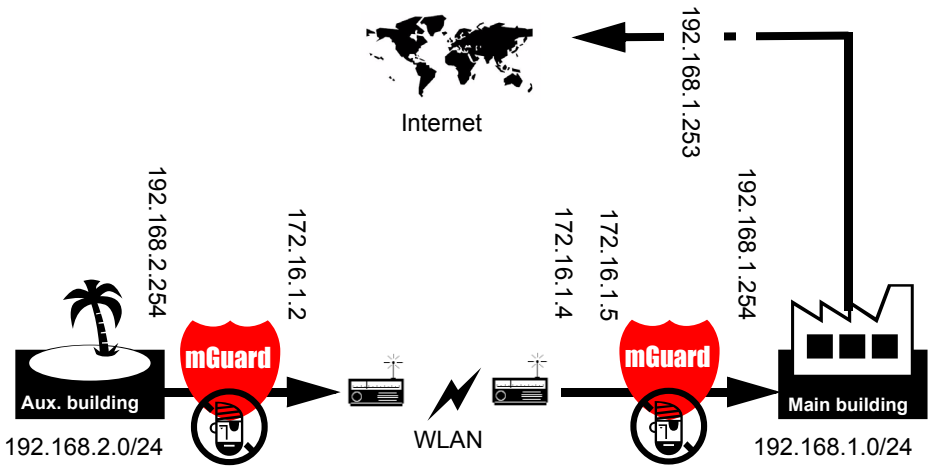


Fig. 2-5 WLAN over VPN

In this example, the mGuards were switched to *Router mode* and a separate network with addresses of 172.16.1.x was created for the WLAN.

As Internet access should also be available via the VPN from the auxiliary building, a “Default route over VPN” is configured here.

Auxiliary building tunnel configuration

Connection type	Tunnel (Network <-> Network)
Local network address	192.168.2.0/24
Remote network address	0.0.0.0/0

The appropriate connection counterpart is configured in the main building:

Main building tunnel configuration

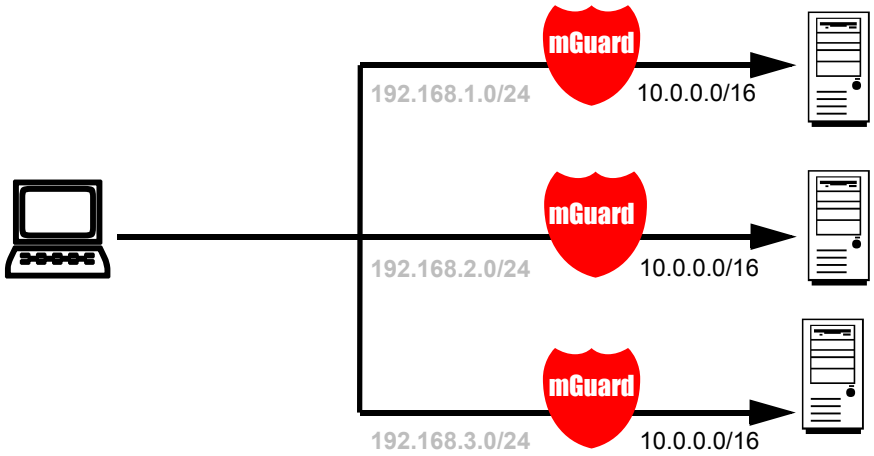
Connection type	Tunnel (Network <-> Network)
Local network	0.0.0.0
Remote network address	192.168.2.0/24

The default route of an mGuard is usually directed over the WAN port, but in this case the Internet is accessible via the LAN port:

Main building default gateway

IP of default gateway	192.168.1.253

2.6 Solving network conflicts



Solving network conflicts

In the example above, the networks on the right-hand side should be accessible from the network or the computer on the left-hand side. However, due to historical or technical reasons, the networks overlap on the right-hand side.

The conflict can be solved by rewriting these networks using the mGuard 1:1 NAT feature.

(1:1 NAT can be used in normal routing and in IPsec tunnels.)

3 Control Elements and Displays

3.1 mGuard centerport

Front side

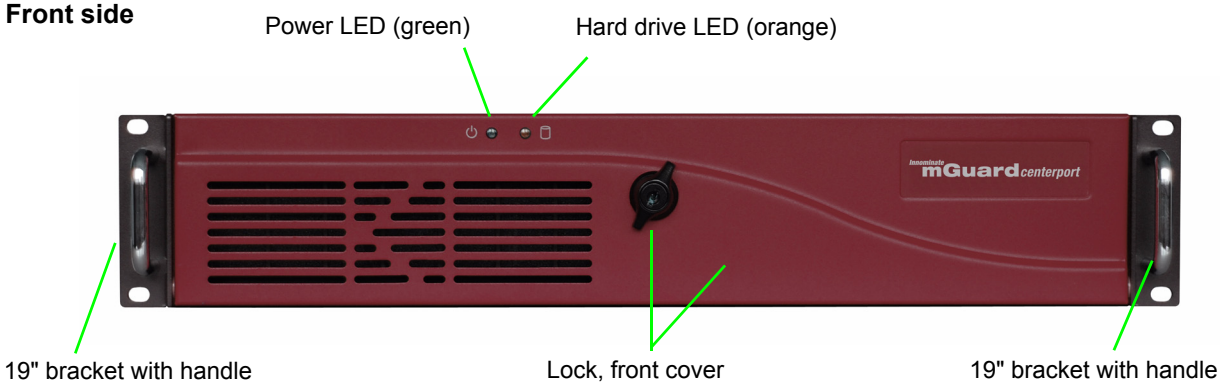


Fig. 3-1 Control elements and displays on mGuard centerport – front side

Table 3-1 Displays on mGuard centerport

LED	State	Meaning
Green	Green	Lights up when the system is switched on
Orange	Orange	Lights up when the hard drive is accessed

With front cover opened

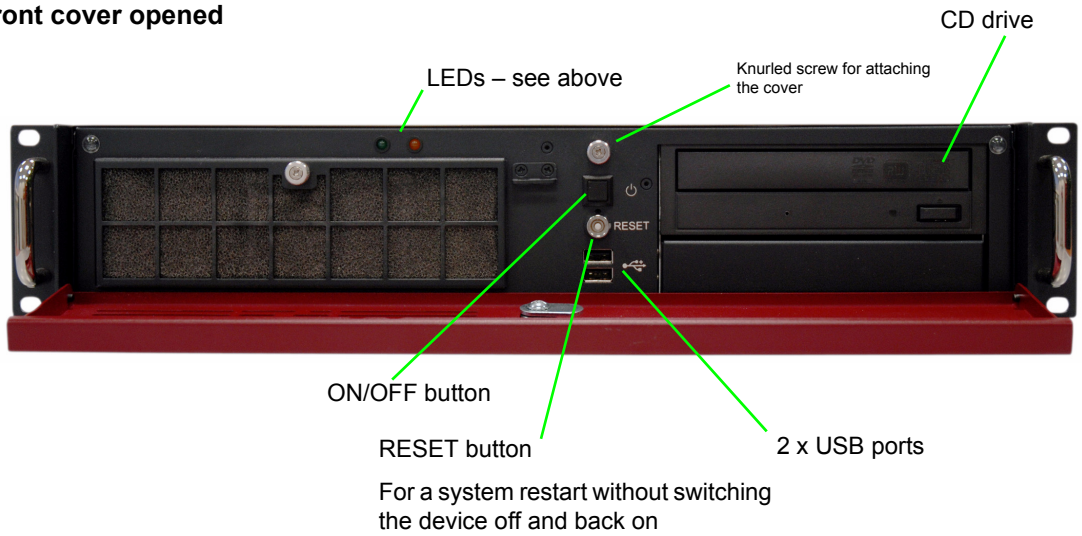

CD drive
LEDs – see above
Knurled screw for attaching the cover
RESET
ON/OFF button
RESET button
For a system restart without switching the device off and back on
2 x USB ports

Fig. 3-2 Control elements on mGuard centerport with front cover opened

3.2 mGuard industrial RS

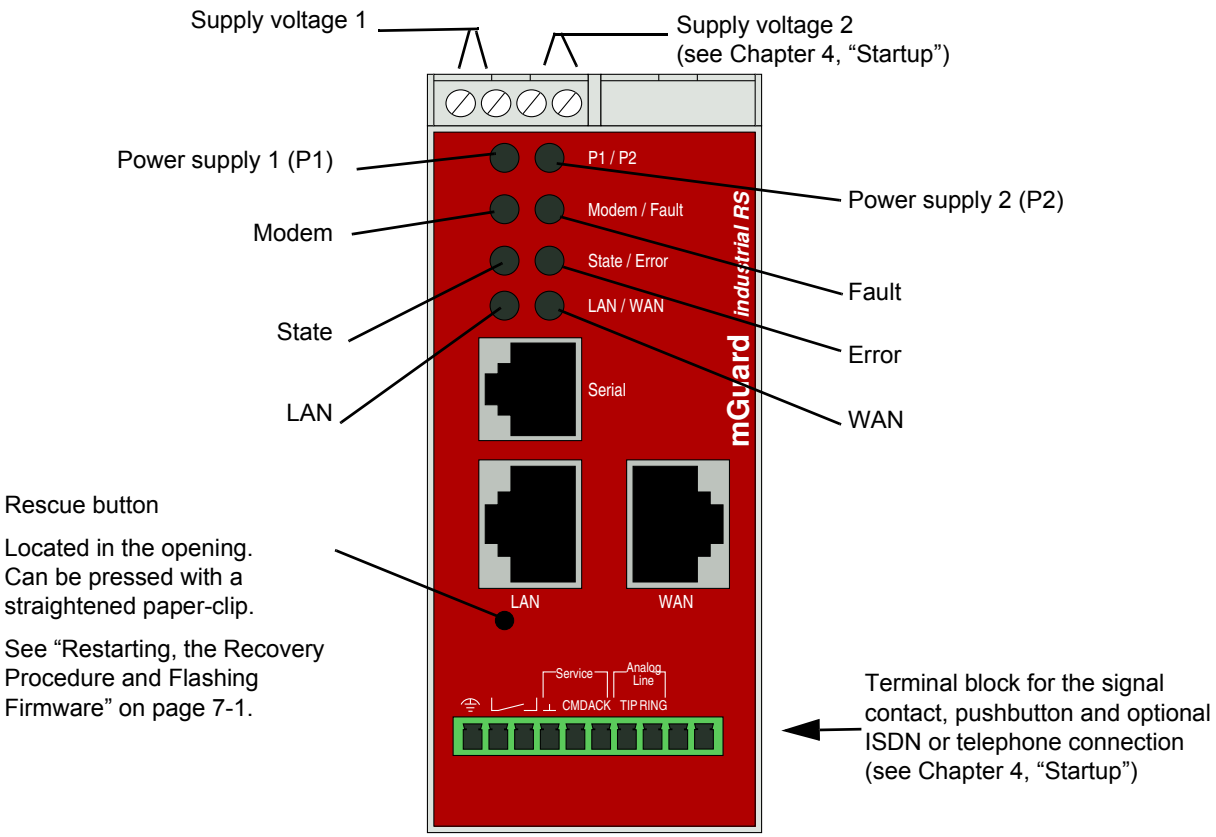


Fig. 3-3 Control elements and displays on mGuard industrial RS

Table 3-2 Displays on mGuard industrial RS

LED	State	Meaning
P1	Green	Power supply 1 is active
P2	Green	Power supply 2 is active
Modem	Green	Connection established over modem
Fault	Red	The signal contact is open due to an error (see “Installing the mGuard industrial RS” on page 4-9 under “Signal contact” on page 4-13). (The signal contact is interrupted during a reboot.)
State	Green flashing	**Heartbeat.** The device is correctly connected and functioning.
Error	Red flashing	**System error.** Reboot the system. – Press the Rescue button briefly (1.5 seconds). – Alternatively, disconnect the device from its power supply briefly, then reconnect it. If the error continues to occur, start the *recovery procedure* (see “Performing a recovery procedure” on page 7-2) or contact the support department.

Table 3-2 Displays on mGuard industrial RS (continued)

LED	State	Meaning
State + Error	Flashing alternately (green-red)	**Boot process.** After connecting the device to the power supply. The LED switches to heartbeat mode after a few seconds.
LAN	Green	**Ethernet status.** Shows the status of the LAN and WAN ports. As soon as the device is connected to the relevant network, the LEDs are illuminated continuously to indicate the presence of a network connection over LAN or WAN. The LEDs are extinguished briefly when data packets are transferred.
WAN	Green	

3.3 mGuard smart

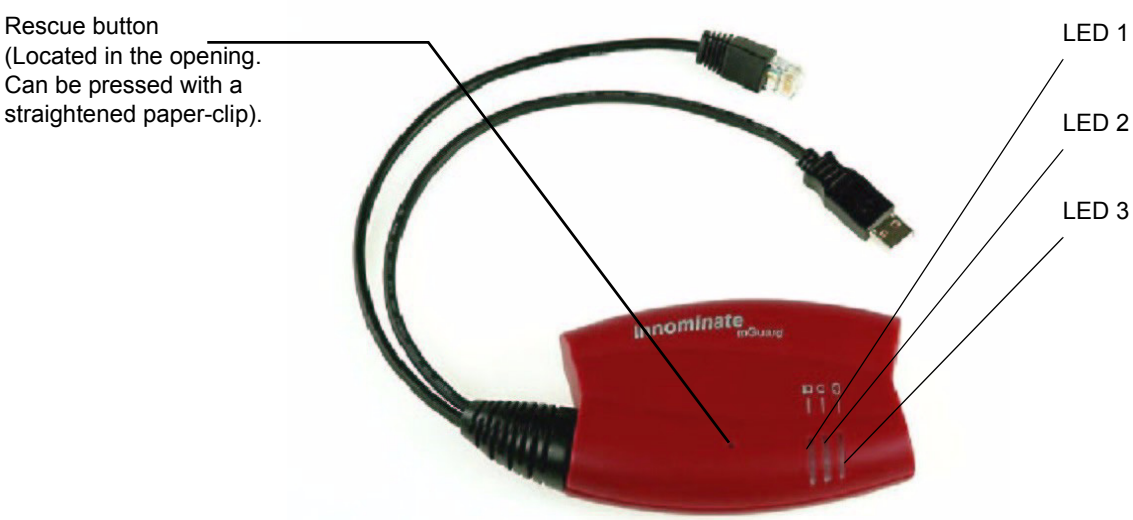


Fig. 3-4 Control elements and displays on mGuard smart

Table 3-3 Displays on mGuard smart

LEDs	Color	State	Meaning
2	Red/green	Red/green flashing	**Boot process.** After connecting the device to the power supply. The LED switches to heartbeat mode after a few seconds.
	Green	Flashing	**Heartbeat.** The device is correctly connected and functioning.
	Red	Flashing	**System error.** Reboot the system. • Press the Rescue button briefly (1.5 seconds). • Alternatively, disconnect the device from its power supply briefly, then reconnect it. If the error continues to occur, start the *recovery procedure* (see “Performing a recovery procedure” on page 7-2) or contact the support department.
1 and 3	Green	On or flashing	**Ethernet status.** LED 1 shows the status of the LAN port. LED 3 shows the status of the WAN port. As soon as the device is connected, the LEDs are illuminated continuously to indicate the presence of a network connection. The LEDs are extinguished briefly when data packets are transferred.
1, 2, 3	Various LED illumination codes		**Recovery mode.** After pressing the **Rescue** button. See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

3.4 mGuard PCI

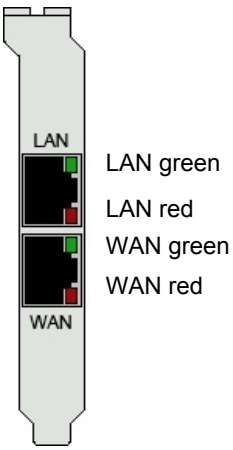


Fig. 3-5 Control elements and displays on mGuard PCI

Table 3-4 Displays on mGuard PCI

LEDs	Color	State	Meaning
WAN, LAN	**Red**	Flashing	**Boot process.** After starting or restarting the computer.
WAN	**Red**	Flashing	**System error**. Reboot the system. • Press the Rescue button briefly (1.5 seconds). • Alternatively, disconnect the device from its power supply briefly, then reconnect it. If the error continues to occur, start the *recovery procedure* (see “Performing a recovery procedure” on page 7-2) or contact the support department.
WAN, LAN	**Green**	On or flashing	**Ethernet status.** Shows the status of the LAN and WAN interfaces. As soon as the device is connected, the LEDs are illuminated continuously to indicate the presence of a network connection. The LEDs are extinguished briefly when data packets are transferred.
WAN **LAN**	**Red Green** **Green**	Various LED illumination codes	**Recovery mode.** After pressing the **Rescue** button*. See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

* In the mGuard PCI, the Rescue button is located on the circuit board (see “Hardware installation” on page 4-27).

3.5 mGuard blade

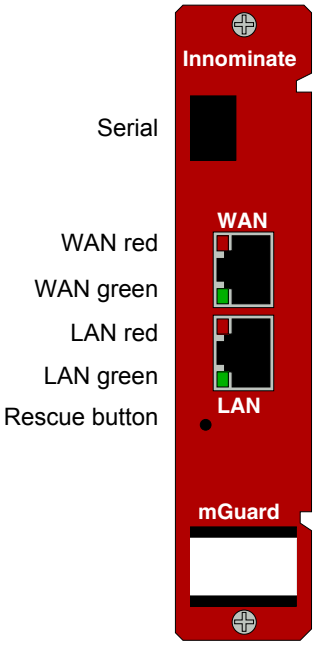


Fig. 3-6 Control elements and displays on mGuard blade

Table 3-5 mGuard blade

LEDs	Color	State	Meaning
WAN, LAN	**Red**	Flashing	**Boot process.** After starting or restarting the computer.
WAN	**Red**	Flashing	**System error.** Reboot the system. • Press the Rescue button briefly (1.5 seconds). If the error continues to occur, start the *recovery procedure* (see “Performing a recovery procedure” on page 7-2) or contact the support department.
WAN, LAN	**Green**	On or flashing	**Ethernet status.** Shows the status of the LAN and WAN interfaces. As soon as the device is connected, the LEDs are illuminated continuously to indicate the presence of a network connection. The LEDs are extinguished briefly when data packets are transferred.
WAN **LAN**	**Green** **Red** **Green**	Various LED illumination codes	**Recovery mode.** After pressing the **Rescue** button. See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

3.6 EAGLE mGuard

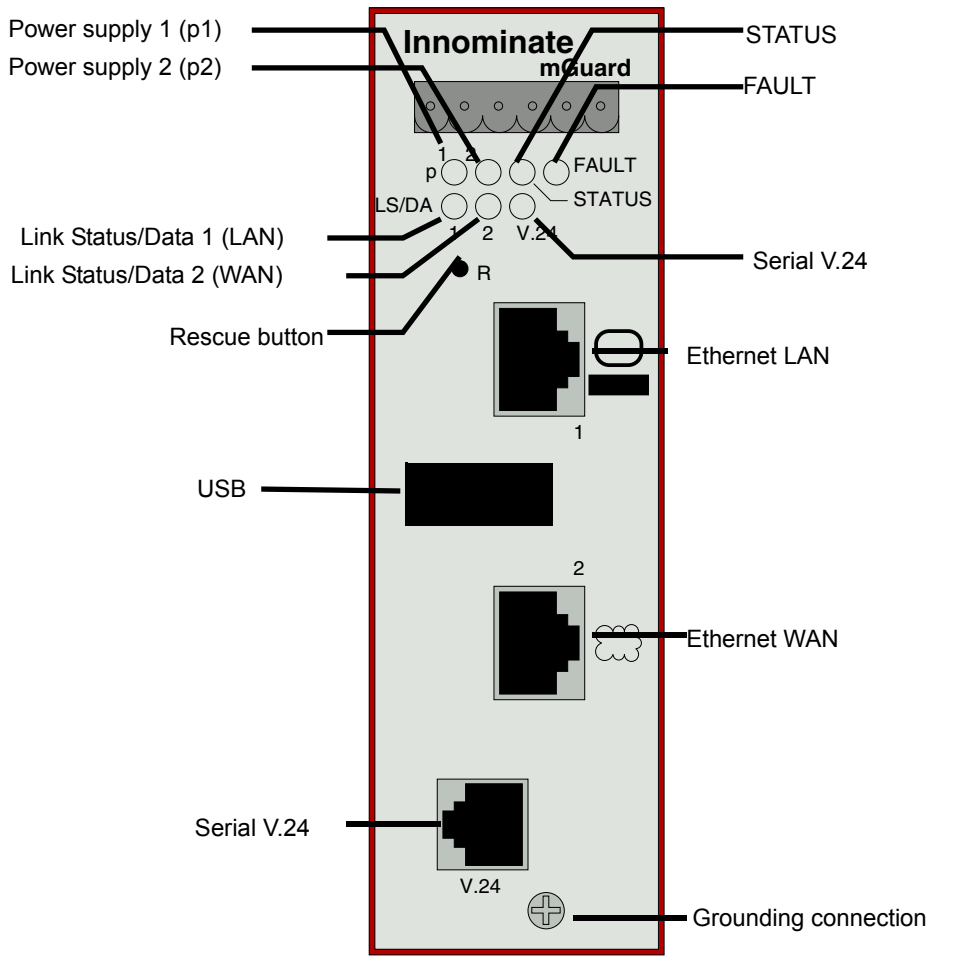


Fig. 3-7 Control elements and displays on EAGLE mGuard

Table 3-6 Displays on EAGLE mGuard

LEDs	State	Meaning
p1, p2	Green	**Power supply 1 or 2 is active.**
STATUS	Green flashing	The mGuard is booting.
	Green	The mGuard is ready.
FAULT	Red	**The signal contact is open due to an error** (see “Installing the EAGLE mGuard” on page 4-19 under “Signal contact” on page 4-13).
LS/DA 1/2 V.24	Green	**Link detected**
	Yellow flashing	Data transfer

3.7 mGuard delta

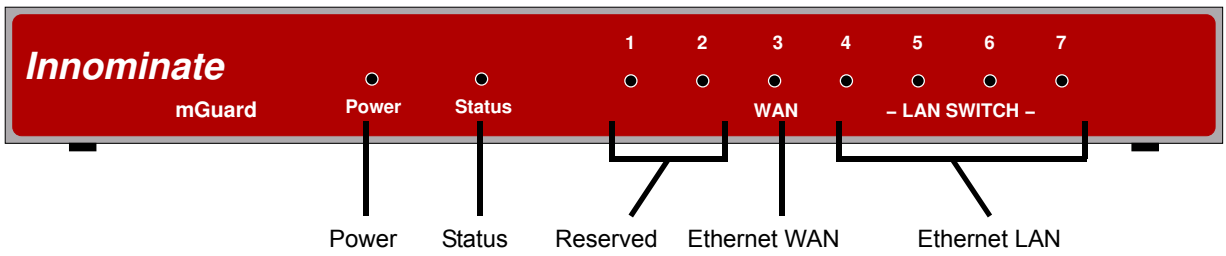


Fig. 3-8 Control elements and displays on mGuard delta

Table 3-7 Displays on mGuard delta

LEDs	State	Meaning
Power	On	**The power supply is active.**
Status	On	The mGuard is booting.
	Heartbeat (Flash, flash, pause, ...)	The mGuard is ready.
1,2	–	**Reserved**
3 (WAN)	On	**Link detected**
	Flashing	Data transfer
4–7 (LAN)	On	Link detected
	Flashing	Data transfer

4 Startup

4.1 Safety instructions

To ensure correct operation and guarantee the safety of the environment and personnel, the mGuard must be installed, operated and maintained correctly.

WARNING: Intended use

Please only use the mGuard in the manner intended and for purposes to which it is suited.

WARNING: Only connect LAN installations to RJ45 sockets

Only connect the mGuard network ports to LAN installations. Some communication connection points also use RJ45 sockets, which must not be connected to the RJ45 sockets of the mGuard.

Please also note the additional safety instructions for the device in the following sections.

General notes regarding usage

ATTENTION: Connection notes

– A free PCI slot (3.3 V or 5 V) must be available on your PC when using the mGuard PCI.
– Do not bend connection cables. Only use the network connector for connection to a network.

ATTENTION: Selecting suitable ambient environmental conditions

– Ambient temperature:
  0°C to +40°C (mGuard smart, mGuard blade, mGuard delta)
  Maximum 70°C (mGuard PCI)
  Maximum 55°C (mGuard industrial RS, EAGLE mGuard)
  Maximum 50°C (mGuard centerport)
– Maximum 90% non-condensing humidity
  (mGuard smart, mGuard blade, mGuard delta, mGuard PCI, mGuard centerport)
  Maximum 95% non-condensing humidity
  (mGuard industrial RS, EAGLE mGuard)

To avoid overheating, do not expose to direct sunlight or other heat sources.

ATTENTION: Cleaning

Use a soft cloth to clean the device housing. Do not use abrasive solvents or liquids.

Startup steps

To start the device, perform the following steps in the given sequence:

Table 4-1 Startup steps

Step	Objective	Page
1	Check the scope of delivery. Read the Release Notes.	“Checking the scope of delivery” on page 4-3
2	Connect the device.	“Installing and booting the mGuard centerport” on page 4-4 “Installing the mGuard industrial RS” on page 4-9 “Connecting the mGuard smart” on page 4-16 “Installing the mGuard blade” on page 4-17 “Installing the EAGLE mGuard” on page 4-19 “Connecting the mGuard delta” on page 4-22 “Installing the mGuard PCI” on page 4-23
3	Configure the device as required. Proceed through the various options provided in the mGuard configuration menus. Please consult the relevant sections of this manual for more information regarding the required options and settings for your operating environment.	“Local configuration at startup” on page 5-3

4.2 Checking the scope of delivery

Before starting up the device, check that the package is complete.

Included in the package

– The mGuard device (mGuard centerport, mGuard industrial RS, mGuard blade, mGuard delta, mGuard PCI, mGuard smart or EAGLE mGuard)
– Quick Installation Guide

The mGuard centerport also contains:

– 2 x keys for the front cover lock
– 2 x AC mains adapters
– Rubber feet (self-adhesive)

The mGuard industrial RS also contains:

– Terminal block for the power supply (attached)
– Terminal block for the signal contact, pushbutton and optional ISDN or telephone connection

The mGuard bladePack also contains:

– 19" mGuard bladeBase
– 1 x mGuard blade as controller
– 2 x power supply units
– 2 x power cables
– 12 x place holders
– 12 x handle plates M1 to M12
– Screws for installing the mGuard bladeBase

The mGuard delta also contains:

– 1 x 5 V DC power supply
– 2 x UTP Ethernet cables

4.3 Installing and booting the mGuard centerport

Rear side

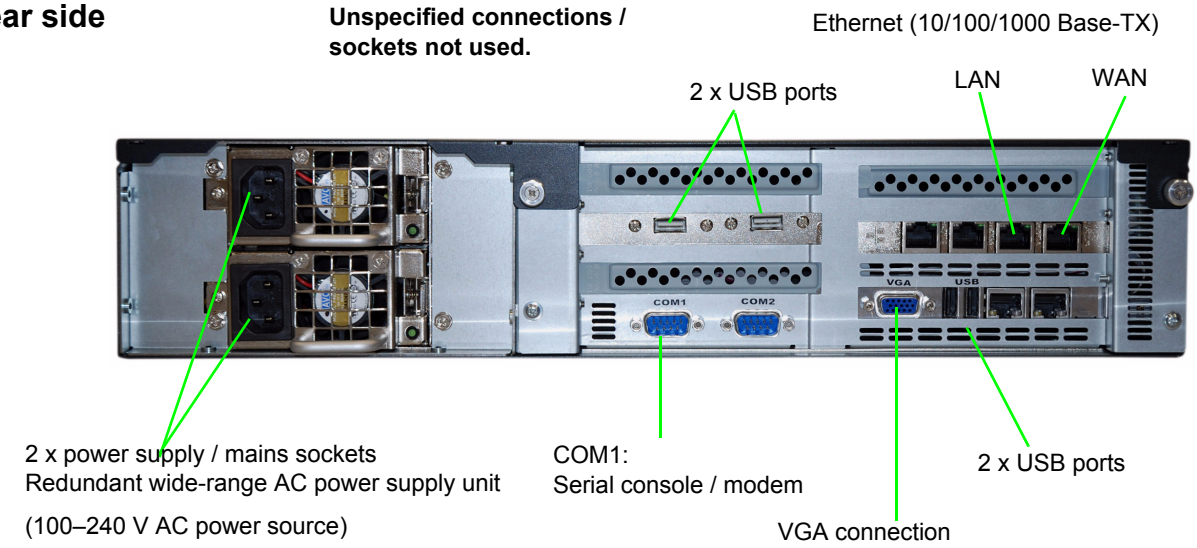


Fig. 4-1 mGuard centerport – rear side

4.3.1 Connecting the device

1. Optional:
   The device can be installed in a 19" industrial cabinet – see “Housing” on page 4-6.
2. Connect both power supply units to the mains power or the power source (100-240 V AC) via the two mains sockets.
3. Establish the network connections – see “Connecting to the network” on page 4-5.
4. Optional:
   Connect a PC monitor (not included) to the **VGA connection**.
   Connect a PC keyboard (not included) to one of the **USB** ports.
   The monitor and keyboard must be connected:
   – In order to use one of the boot options when booting the mGuard centerport – see “Boot options (with connected monitor and keyboard)” on page 4-6.
   – In order to carry out a rescue or recovery procedure – see “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

   The monitor and keyboard do not need to be connected in order to start and operate the device.

4.3.2 Connecting to the network

WARNING:
Only connect the mGuard network ports to LAN installations.

Some communication connection points also use RJ45 sockets, which must not be connected to the RJ45 sockets of the mGuard.

LAN port

- Connect the local computer or network to the LAN port of the mGuard using a UTP (CAT5) Ethernet cable.

WAN port

- Use a UTP cable (CAT5).
- Connect to the external network (e.g. WAN, Internet) via the WAN socket. (Connections to the remote device or network are established over this network.)

COM1: Serial port

ATTENTION: The serial port (RJ12 socket) must not be connected directly to communication connection points. Use a serial cable with an RJ12 connector to connect a serial terminal or a modem. The serial cable can have a maximum length of 30 meters.

The serial port (serial interface) can be used as described under “Serial port” on page 4-15.

4.3.3 Front cover

The lock on the front cover prevents access to the drives, RESET button and ON/OFF button. Keep both supplied keys in a safe place.

With front cover opened

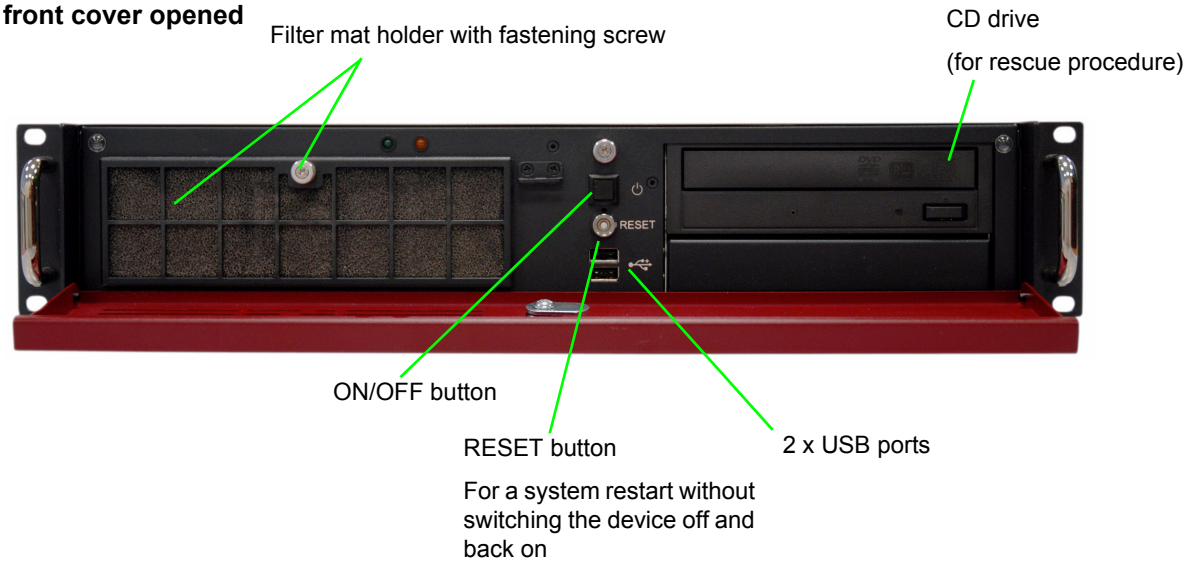

Filter mat holder with fastening screw
CD drive
(for rescue procedure)
RESET
ON/OFF button
RESET button
For a system restart without switching the device off and back on
2 x USB ports

Fig. 4-2 Front of mGuard centerport with front cover opened

4.3.4 Housing

The mGuard centerport housing is manufactured by Kontron, and is designated as a KISS 2U platform. You can find further information on the following points (among others) under www.kontron.com:

– Installation in a 19" industrial cabinet
– Attaching the housing feet
– Removing the 19" bracket from the device
– Care and maintenance

4.3.5 Booting the mGuard centerport

- Press the ON/OFF button.

Result:
The mGuard centerport boots the firmware and is then ready for operation.

4.3.5.1 Boot options (with connected monitor and keyboard)

The following options are available with a monitor and keyboard attached to the device:
- after switching on,
- after a reboot or
- after pressing the RESET button

the BIOS boot messages are displayed on the monitor, followed by the mGuard centerport boot menu.

If the boot menu remains on display for a sustained period, press one of the arrow keys on the keyboard: ↑, ↓, ← or →.

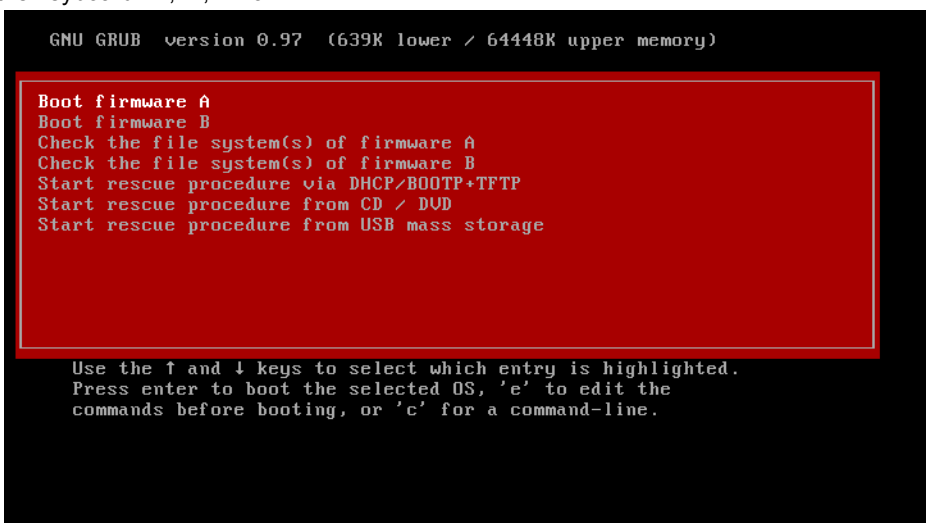

GNU GRUB version 0.97 (639K lower / 64448K upper memory)
Boot firmware A
Boot firmware B
Check the file system(s) of firmware A
Check the file system(s) of firmware B
Start rescue procedure via DHCP/BOOTP+TFTP
Start rescue procedure from CD / DVD
Start rescue procedure from USB mass storage
Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, or 'c' for a command-line.

Fig. 4-3 mGuard centerport boot menu

Proceed as follows to select and enforce one of the boot options:

1. Select one of the displayed options using the ↓ or ↑ arrow keys.
2. Press the **Enter** key.

The boot options are described below:

Boot firmware A

Starts the primary firmware version found on the device (A). This is the default setting, and is applied when the user does not intervene during the boot process.

Boot firmware B

Not supported in firmware version 7.0.0.

Check the file system(s) of firmware A

Checks all firmware file systems and repairs them, if necessary.
This menu point is only required in exceptional cases and when the user is familiar with the process (or following instructions from the Innominate support team). The mGuard firmware also checks and repairs the file systems when needed during the normal boot process. The firmware file systems are used in a robust manner with the mass storage device cache switched off, meaning that repairs are normally not necessary.

Check the file system(s) of firmware B

Not supported in firmware version 7.0.0.

Start rescue procedure via DHCP/BOOTP+TFTP

See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

Start rescue procedure from CD / DVD

See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

Start rescue procedure from USB mass storage

See “Restarting, the Recovery Procedure and Flashing Firmware” on page 7-1.

4.4 Installing the mGuard industrial RS

WARNING:
Do not open the housing.

WARNING:
The shielding ground of the connectable twisted pair lines is electrically connected to the front faceplate.

WARNING:
This is a Class A device, which may cause radio interference in residential areas. In this case, the operator may be requested to take appropriate preventative measures. When installed in residential or office environments, the Innominate mGuard industrial RS may only be operated in switch cabinets with fire protection properties in accordance with EN 60950-1.

4.4.1 Assembly / disassembly

Assembly

The device is delivered in a ready-to-operate condition. The following procedure is required for assembly and connection:

- Pull the terminal block from under the mGuard industrial RS and connect the contact lines and other connections as necessary (see “Connection options on lower terminal block” on page 4-11).
- The screws on the screw terminals must be tightened to at least 0.22 Nm.
  Wait before inserting the terminal block.
- Attach the mGuard industrial RS onto a grounded 35 mm mounting rail according to DIN EN 60715.
  The device conducts the grounding from the mounting rail through to the left contact (grounding connection) on the lower terminal block.

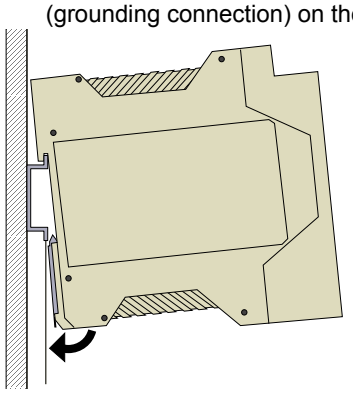


Fig. 4-4 Attaching the mGuard industrial RS to a mounting rail

- Attach the upper snap-on guide of the mGuard industrial RS to the mounting rail and press the mGuard industrial RS down onto the rail until it locks into position.
- Insert the wired terminal block.
- Connect the power supply to the top of the terminal block (see “Connecting to the power supply” on page 4-10).

- Make the necessary network connections on the LAN or WAN port (see “Connecting to the network” on page 4-11).
- If necessary, connect the relevant device to the SERIAL port (see “Serial port” on page 4-15).

Disassembly

- Remove or disconnect the connections.
- To remove the mGuard industrial RS from the mounting rail, insert a screwdriver horizontally under the housing into the locking slide, pull it downwards (without tipping the screwdriver) and lift the mGuard industrial RS upwards.

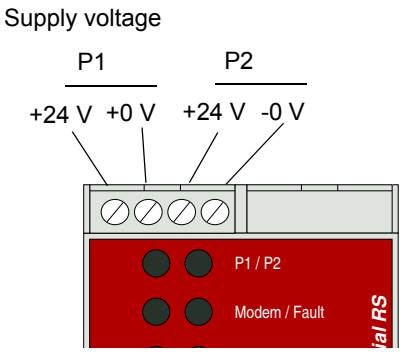
4.4.2 Connecting to the power supply

WARNING:

The mGuard industrial RS is designed for operation with a direct voltage of 9 V DC to 36 V DC / SELV, max. 0.5 A.

Therefore, power supply and signal contact connectors may only be connected with SELV circuits with voltage restrictions in accordance with EN 60950-1.

The supply voltage is connected via a terminal block with a screw mechanism, which is located on the top of the device.



Supply voltage

– NEC Class 2 power source 12 V DC or 24 V DC
– -25% +33% safety extra-low voltage (SELV / PELV, decoupled redundant entries)
– Maximum 5 A
– Min. 10 ms buffer time at 24 V DC

Redundant power supply

Redundant power supplies are supported. Both inputs are decoupled. There is no load distribution. With a redundant supply, only the power supply unit with the higher output voltage supplies the mGuard industrial RS. The supply voltage is electrically isolated from the housing.

In case of a non-redundant voltage supply, the mGuard industrial RS indicates the failure of the supply voltage over the signal contact. You can prevent this signal by connecting the supply voltage to both inputs.

4.4.3 Connecting to the network

WARNING:
Only connect the mGuard network ports to LAN installations.

Use cables with bend relief sleeves for the connectors when setting up the network connections.

Cover unused sockets with the dust caps supplied.

Some communication connection points also use RJ45 sockets, which must not be connected to the RJ45 sockets of the mGuard.

LAN port

- Connect the local computer or network to the LAN port of the mGuard using a UTP (CAT5) Ethernet cable.
  If your computer is already connected to a network, then patch the mGuard between the existing network connection.

Please note that initial configuration can only be made over the LAN interface. The mGuard industrial RS firewall rejects all IP traffic from the WAN to the LAN interface.

WAN port

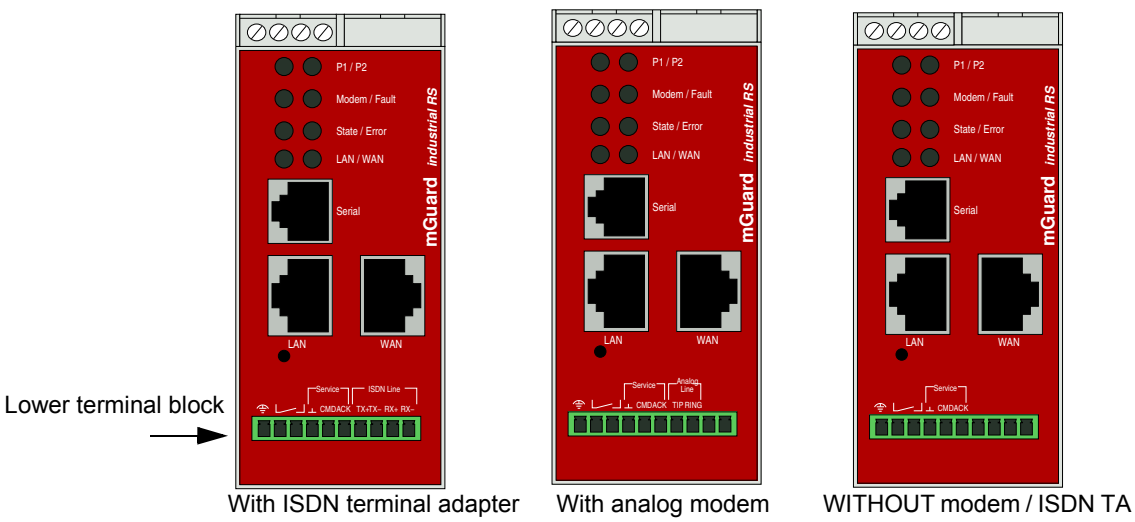
- Use a UTP cable (CAT5).
- Connect to the external network (e.g. WAN, Internet) via the WAN socket. (Connections to the remote device or network are established over this network.)

Additional driver installation is not necessary.

For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration.

Connection options on lower terminal block

The mGuard industrial RS is available in three different versions. These can be distinguished through the connection options on the lower terminal block:



With ISDN terminal adapter | With analog modem | WITHOUT modem / ISDN TA

Fig. 4-5 mGuard industrial RS: Lower terminal block

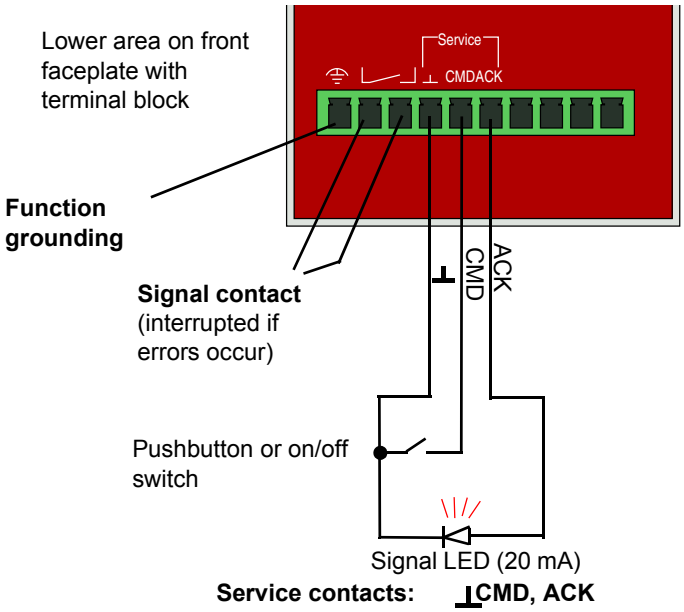


Fig. 4-6 mGuard industrial RS: **without** modem / ISDN terminal adapter

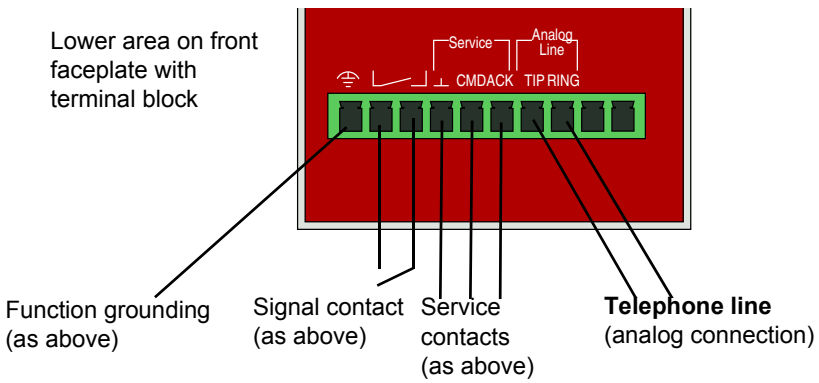


Fig. 4-7 mGuard industrial RS **with modem**

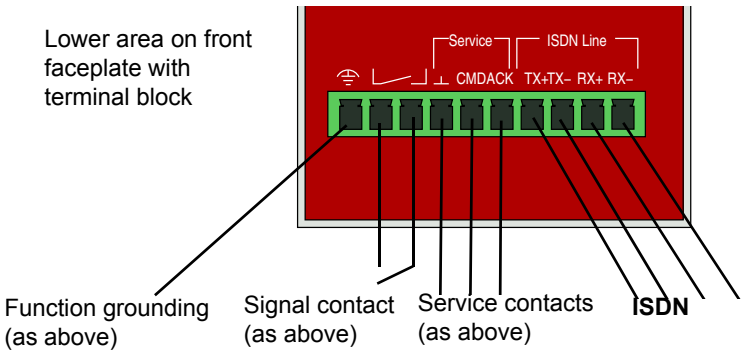


Fig. 4-8 mGuard industrial RS **with ISDN terminal adapter**

Function grounding

The function grounding can be used by the operator. This connection is electrically connected to the rear side of the mGuard industrial RS. The mGuard industrial RS is grounded during the assembly on a mounting rail with a metal clamp. The mounting rail is connected to the rear side of the mGuard. The mounting rail must be electrically grounded.

Signal contact

WARNING: Signal contact connectors may only be connected with SELV circuits with voltage restrictions in accordance with EN 60950-1.

The signal contact is used to monitor the functions of the mGuard industrial RS, thereby enabling remote diagnosis. The following is reported through interruption of the contact using the potential-free signal contact (relay contact, closed current circuit):

– The failure of at least one of the two supply voltages.
– A power supply shortfall for the mGuard industrial RS (supply voltage 1 and/or 2 is less than 9 V).
– The faulty link state of at least one port. The link state report on the mGuard industrial RS can be masked for each port using the management software. No connection monitoring is performed in the factory default condition.
– Self-test error.

The signal contact is interrupted during a reboot until the mGuard is fully operative. This also applies when the signal contact is set manually to *Closed* in the software configuration.

Service contacts

WARNING: The service contacts (_|_, CMD, ACK) must not be connected to an external voltage source, but must be connected as described here.

A **pushbutton** or an **on/off switch** (e.g. key switch) can be connected between the **CMD and _|_** service contacts.

A standard **LED** (up to 3.5 V) or a corresponding optocoupler can be connected between the **ACK (+) and _|_ (-)** contacts. The contact is short-circuit proof and supplies a maximum of 20 mA. The LED or optocoupler must be connected without a series resistor (see Fig. 4-6 or Fig. 4-8 for wiring information).

The **pushbutton** or **on/off switch** is used for establishing and disabling a previously defined VPN connection. The LED displays the status of the VPN connection (see “IPsec VPN >> Global” on page 6-157 under Options).

Operating a connected pushbutton

- To establish a VPN connection, press and hold the pushbutton for a few seconds until the signal LED flashes. Only release the pushbutton at this point.
  The flashing LED signals that the mGuard has received the command for establishing a VPN connection and has started the connection process. The LED lights up continuously when the VPN connection has been established.
- To disable the VPN connection, press and hold the pushbutton for a few seconds until the signal LED flashes or goes out. Only release the pushbutton at this point.
  The VPN connection is disabled when the signal LED no longer lights up.

Operating a connected on/off switch

- To establish the VPN connection, turn the switch to ON.
- To disable the VPN connection, turn the switch to OFF.

Signal LED

If the signal LED is set to OFF, then the defined VPN connection is disabled. The VPN connection was not established or has failed due to an error.

If the signal LED is set to ON, then the VPN connection is established.

If the signal LED flashes, then the VPN connection is currently being established or disabled.

Analog line (with built-in modem)

WARNING: The analog connections (TIP, RING) must only be connected to the communication cable designed for this purpose.

The TIP and RING contacts are used for connection to a telephone landline (analog connection).

The following descriptions are used in Germany for the contact details on the frontplate.

TIP = a **RING = b**

ISDN line (with built-in ISDN terminal adapter)

WARNING: The ISDN connections (TX+, TX-, RX+, RX-) must only be connected to an ISDN S0 bus.

The TX+, TX-, RX+ and RX- contacts are used for connection to the ISDN and identify the mGuard industrial RS as an ISDN participant. The following table describes the assignment of the contacts to 8-pin connections for both connectors and sockets (for example, RJ45):

Table 4-2 Assignment of contacts to 8-pin connections

Pin number	TE (mGuard)
3	TX+
4	RX+
5	RX-
6	TX-

Serial port

WARNING: The serial port (RJ12 socket) must not be connected directly to communication connection points. Use a serial cable with an RJ12 connector to connect a serial terminal or a modem. The serial cable can have a maximum length of 30 meters.

The serial port (serial interface) can be used as follows:

For configuration of the mGuard over the serial port. There are two possibilities here:

– A PC is connected directly (over its serial port) to the serial port of the mGuard. The PC user can then use a terminal program to configure the mGuard via the command line interface.

– Alternatively, a modem is connected to the serial port of the mGuard. This modem is connected to the telephone network (landline or GSM network). The user of a remote PC (also connected to the telephone network using a modem) can establish a PPP dial connection (PPP = Point-to-Point Protocol) to the mGuard, and can then configure it using their web browser.

For handling data transfers over the serial port instead of the mGuard WAN interface. In this case, a modem is connected to the serial port.

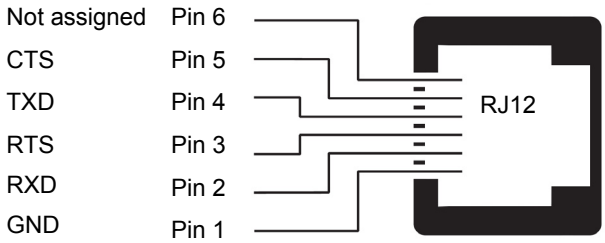


Fig. 4-9 Pin assignment of the RJ12 socket (serial port)

On the mGuard industrial RS with built-in modem or ISDN terminal adapter, traffic can pass over the *analog line* or *ISDN line* connections instead of the WAN interface.

4.5 Connecting the mGuard smart

LAN port

Ethernet connector for direct connection to the protected device or network (**local** device or network).

USB connector

Used for connection to the USB interface of a computer.
Only used as a power supply!

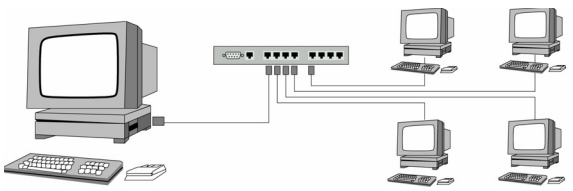
WAN port

Socket for connection to an external network, e.g. WAN, Internet.
(Connections to the remote device or network are established over this network.)

Use a UTP cable (CAT 5).

Fig. 4-10 mGuard smart: Connections

Before:



After:

(A LAN can also be on the left.)

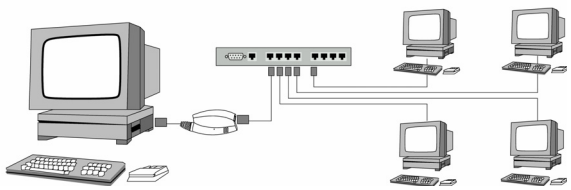


Fig. 4-11 mGuard smart: Network connection

If your computer is already connected to a network, then insert the mGuard smart between the existing network interface of the computer (network card) and the network.

Additional driver installation is not necessary.

For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration.

WARNING: This is a Class A device, which may cause radio interference in residential areas. In this case, the operator may be requested to take appropriate preventative measures.

4.6 Installing the mGuard blade

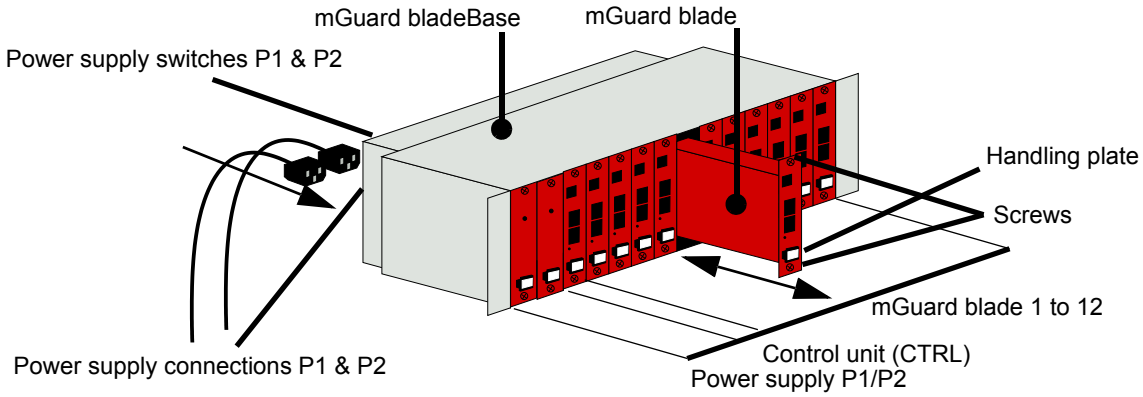


Fig. 4-12 Installing the mGuard blade

ATTENTION: It is very important to ensure sufficient air circulation for the bladePack!

When stacking several bladePacks, fan trays must be installed to discharge the accumulated warm air!

Installing the mGuard bladeBase

- Install the mGuard bladeBase into the rack (e.g. close to the patch panel).
- Provide the two front power supplies and the control unit with the handling plates “P1”, “P2” and “Ctrl” from left to right.
- Connect both power supplies on the back of the mGuard bladeBase with 100 V or 220 / 240 V.
- Switch both power supplies on.
- The LEDs on the front of the power supplies should now light up green.

Installing the mGuard blade

The mGuard bladeBase does not need to be switched off during installation or deinstallation of an mGuard blade.

- Loosen the upper and lower screw of the faceplace or the mGuard blade to be replaced.
- Remove the faceplace or pull out the old mGuard blade.
- Insert the new mGuard blade and circuit board into the plastic guides and push until it is completely installed in the mGuard bladeBase.
- Secure the mGuard blade by tightening the screws lightly.
- Replace the empty handling plate with the suitable number from the mGuard bladeBase accessories, or replace it with the plate from the old mGuard blade. To do this, pull or push the plate in a sideways motion.

Control unit (CTRL slot)

The “CTRL” slot is located right next to the two power supplies. An mGuard blade operated here works as a controller for all other mGuard blades.

During the first installation of an mGuard blade into the “CTRL” slot, the blade is reconfigured as a control unit as follows:

– The user interface is reconfigured for operation as a controller.
– It switches into router mode with the local IP address 192.168.1.1.
– The firewall, CIFS Integrity Monitoring and VPN services are reset and deactivated.

Connecting the mGuard blade

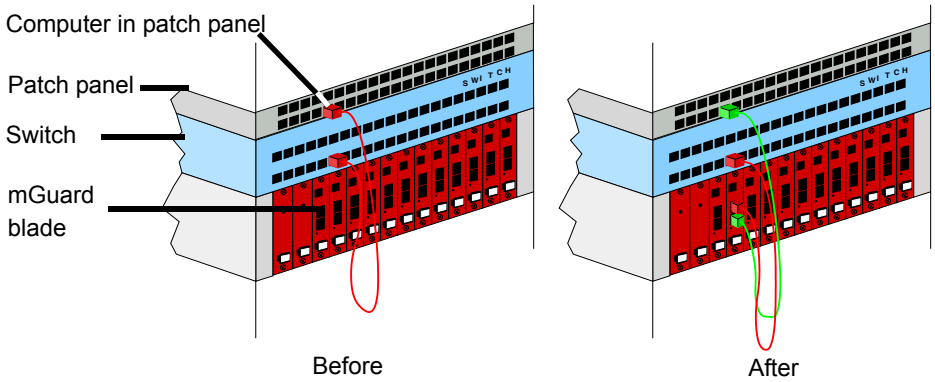


Fig. 4-13 Connecting the mGuard blade to the network

ATTENTION: If your computer is already attached to a network, then patch the mGuard blade between the existing network connection.

Please note that initial configuration can only be made from the local computer over the LAN interface. The mGuard firewall rejects all IP traffic from the WAN to the LAN interface.

Additional driver installation is not necessary.

For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration.

Serial port

ATTENTION: The serial port (RJ12 socket) must not be connected directly to communication connection points. Use a serial cable with an RJ12 connector to connect a serial terminal or a modem. The serial cable can have a maximum length of 30 meters.

The serial port (serial interface) can be used as described under “Serial port” on page 4-15.

4.7 Installing the EAGLE mGuard

WARNING: Do not open the housing.

WARNING: This is a Class A device, which may cause radio interference in residential areas. In this case, the operator may be requested to take appropriate preventative measures. When installed in residential or office environments, the EAGLE mGuard may only be operated in switch cabinets with fire protection properties in accordance with EN 60950-1.

ATTENTION: The shielding ground of the connectable industrial twisted pair lines is electrically connected to the front faceplate.

Connecting the power supply and signal contact

Terminal block

The power supply and signal contact are connected via a 6-pin terminal block.

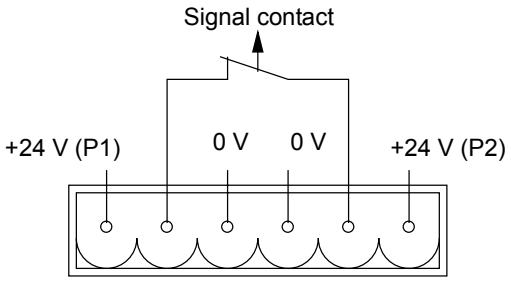


Fig. 4-14 Terminal block

WARNING: The EAGLE mGuard is intended for safety extra-low voltage (SELV) operation. Therefore, power supply and signal contact connectors may only be connected with PELV or SELV circuits with voltage restrictions in accordance with EN 60950-1.

The EAGLE mGuard can be operated with a DC voltage of 9.6–60 V DC, max. 1 A, or with an AC voltage of 18–30 V AC, max. 1 A. Use the +24 V and 0 V pins to connect the DC voltage.

Operating voltage

– NEC Class 2 power source 12 V DC or 24 V DC, -25% +33%
– Safety extra-low voltage (SELV/PELV, decoupled redundant entries)
– Max. 5 A, min. 10 ms buffer time at 24 V DC

Redundant power supply

Redundant power supplies are supported. Both inputs are decoupled. There is no load distribution. With a redundant supply, only the power supply unit with the higher output voltage supplies the EAGLE mGuard.

The supply voltage is electrically isolated from the housing.

Startup

- Start the EAGLE mGuard by connecting the supply voltage via the 6-pin terminal block.
- Lock the terminal block with the locking screw at the side.

Signal contact

WARNING: The signal contact may only be connected to PELV circuits or SELV circuits with voltage restrictions in accordance with EN 60950-1.

The signal contact is used to monitor the functions of the EAGLE mGuard and thereby allows remote diagnosis. The following is reported through interruption of the contact using the potential-free signal contact (relay contact, closed current circuit):

– The failure of at least one of the two supply voltages.
– A permanent fault on the EAGLE mGuard (internal 3.3 V DC voltage, supply voltage 1 or 2 < 9.6 V, etc.).
– The faulty link state of at least one port. The link state report on the EAGLE mGuard can be masked for each port using the management software.
  No connection monitoring is performed in the factory default condition.
– Self-test error.

In case of a non-redundant voltage supply, the EAGLE mGuard indicates the failure of the supply voltage. You can prevent this signal by connecting the supply voltage to both inputs.

Grounding connection

• The EAGLE mGuard is grounded with a separate screw connection.

Serial port

WARNING: The serial port (RJ12 socket) must not be connected directly to communication connection points. Use a serial cable with an RJ12 connector to connect a serial terminal or a modem. The serial cable can have a maximum length of 30 meters.

The serial port (serial interface) can be used as described under “Serial port” on page 4-15. However, the connections for the contacts are different, as the following figure shows:

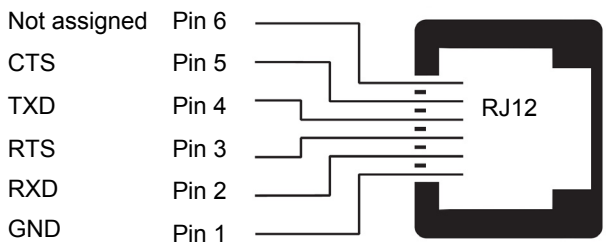


Fig. 4-15 Pin assignment of the RJ12 socket (serial port)

Assembly

The device is delivered in a ready-to-operate condition. The following procedure is required for the assembly process:

• Detach the terminal block from the EAGLE mGuard and connect the supply voltage and signal contact lines.

- Attach the EAGLE mGuard onto a 35 mm mounting rail according to DIN EN 60715.

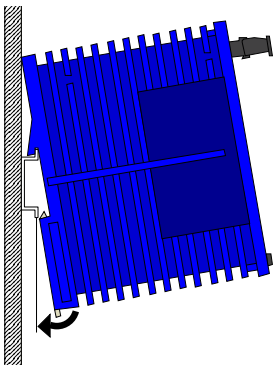


Fig. 4-16 EAGLE mGuard: Mounting rail assembly

- Attach the upper snap-on guide of the EAGLE mGuard to the mounting rail and press the mGuard down until it locks into position.
- Connect the device to the local network or the local computer which is to be protected (LAN).
- Connect the socket for connection to the external network (WAN), for example, to the Internet. Connections to the remote device or network are established over this network.
- The front faceplate of the EAGLE mGuard housing is grounded via the grounding connection.

Network connection

ATTENTION: If your computer is already attached to a network, then patch the EAGLE mGuard between the existing network connection.

Please note that initial configuration can only be made over the LAN interface. The EAGLE mGuard firewall rejects all IP traffic from the WAN to the LAN interface.

Additional driver installation is not necessary.

For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration.

Both network interfaces of the EAGLE mGuard are configured for connection to a computer.

Please note the following when connecting to a **hub**:

When *Automatic Negotiation* is deactivated, the Auto MDIX function is also deactivated. This means that the EAGLE mGuard port must be either connected to the uplink port of the hub or be connected using a cross-link cable.

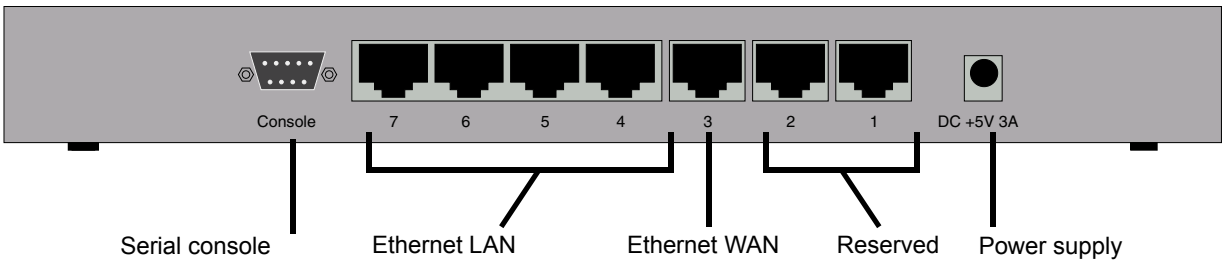
Disassembly

To remove the EAGLE mGuard from the mounting rail, insert a screwdriver horizontally under the housing into the locking slide, pull it downwards (without tipping the screwdriver) and lift the EAGLE mGuard upwards.

4.8 Connecting the mGuard delta

WARNING: The serial port (DE-9 plug connection) must not be connected directly to communication connection points. Use a serial cable with a DE-9 connector to connect a serial terminal or a modem.

The serial cable can have a maximum length of 30 meters.



Connecting the mGuard delta

- Connect the power supply (5 V DC, 3 A) to the corresponding mGuard delta power socket.
- Connect the local computer or network to one of the Ethernet LAN sockets (4 to 7) on the mGuard delta using a UTP (CAT5) Ethernet cable.

4.9 Installing the mGuard PCI

WARNING: This is a Class A device, which may cause radio interference in residential areas. In this case, the operator may be requested to take appropriate preventative measures.

WARNING: Conditions of acceptability
The device has been designed for PC installation in a secondary signal circuit. As a result, no tests have been made. Tests must be evaluated by the user.
The circuit board temperature must not exceed 105°C.

Selection of Driver mode or Power-over-PCI mode

There are two operating modes: *Driver mode* or *Power-over-PCI mode.*

- Decide in which mode the mGuard PCI should be operated before installation on your computer.
- The mGuard is switched to the desired mode via a jumper.

Driver mode

The mGuard PCI can be used like a normal network card. The network card then also provides the mGuard functions.

In this case, the driver provided must be installed.

Power-over-PCI mode

If the mGuard network card function is not needed or should not be used, then the mGuard PCI can be connected behind an existing network card (of the same or another computer). It then essentially acts as a stand-alone mGuard device. In reality, the mGuard PCI is only plugged into the PCI slot of the computer in this mode in order to receive a power supply and have a housing. This mGuard operating mode is known as *Power-over-PCI* mode.

No drivers are installed.

4.9.1 Driver mode

In this mode, an mGuard PCI interface driver needs to be installed afterwards on the computer (available for Windows XP/2000 and Linux). No additional network cards are required for the computer in Driver mode.

Stealth mode in Driver mode (factory default)

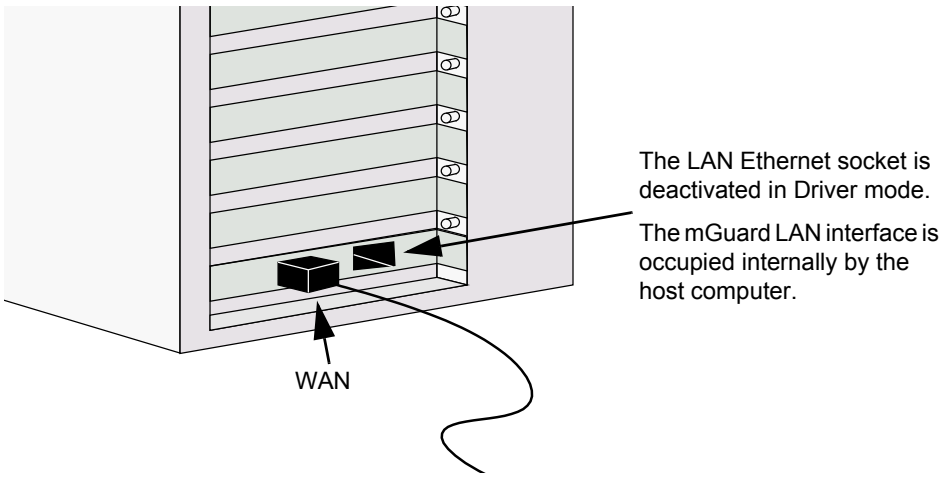

The LAN Ethernet socket is deactivated in Driver mode.
The mGuard LAN interface is occupied internally by the host computer.
WAN

Fig. 4-17 Driver mode: Stealth mode

In *Stealth* mode, the mGuard acts as a normal network card.

The IP address configured for the network interface of the operating system (LAN port) is also used by the mGuard for its WAN port. By doing this, the mGuard does not appear as an individual device with its own address for data traffic to and from the computer.

It is not possible to use PPPoE or PPTP in Stealth mode.

Router mode in Driver mode

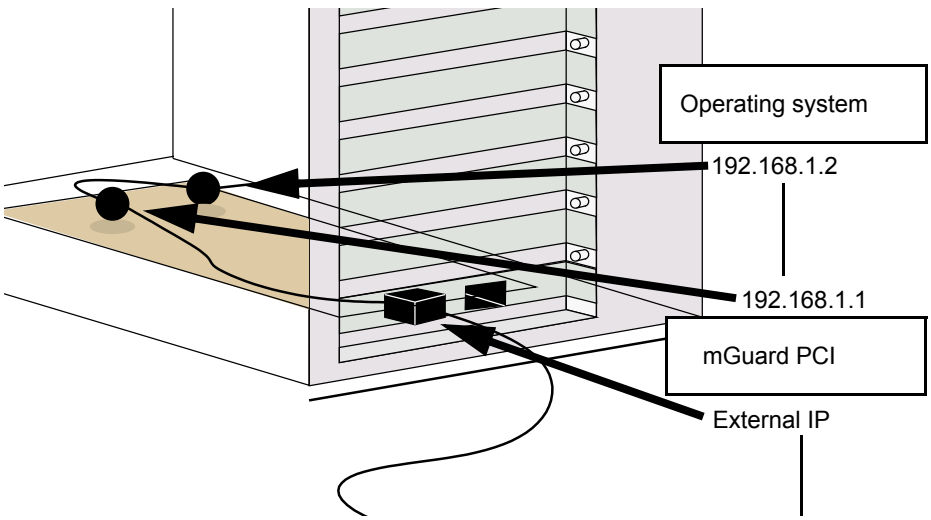


Fig. 4-18 Driver mode: Router mode

If the mGuard is in *Router* mode (or *PPPoE* or *PPTP* mode), it forms its own network together with the operating system on the computer on which the mGuard is installed.

This has the following significance for the IP configuration of the operating system network interface: The network interface must be assigned an IP address that is different to the internal IP address of the mGuard (according to the factory default of 192.168.1.1).

(This is represented in the above figure by two black spheres.)

A third IP address is used for the mGuard interface to the WAN. The connection to an external network (e.g. Internet) is made via this IP address.

4.9.2 Power-over-PCI mode

Stealth mode in Power-over-PCI mode

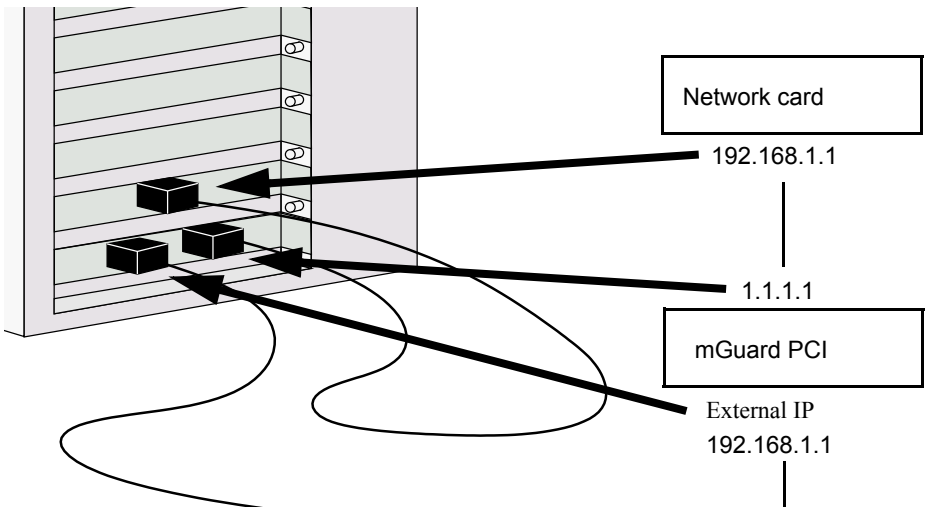


Fig. 4-19 Power-over-PCI mode: Stealth mode

No driver software is installed in Power-over-PCI mode, as the mGuard PCI network card function is switched off.

A previously installed network card is connected to the LAN port of the mGuard PCI, and this network card is located on the same (or on another) computer (see “Hardware installation” on page 4-27).

In *Stealth* mode, the IP address configured for the network interface of the operating system (LAN port) is also used by the mGuard for its WAN port. By doing this, the mGuard does not appear as an individual device with its own address for data traffic to and from the computer.

It is not possible to use PPPoE or PPTP in Stealth mode.

Router mode in Power-over-PCI mode

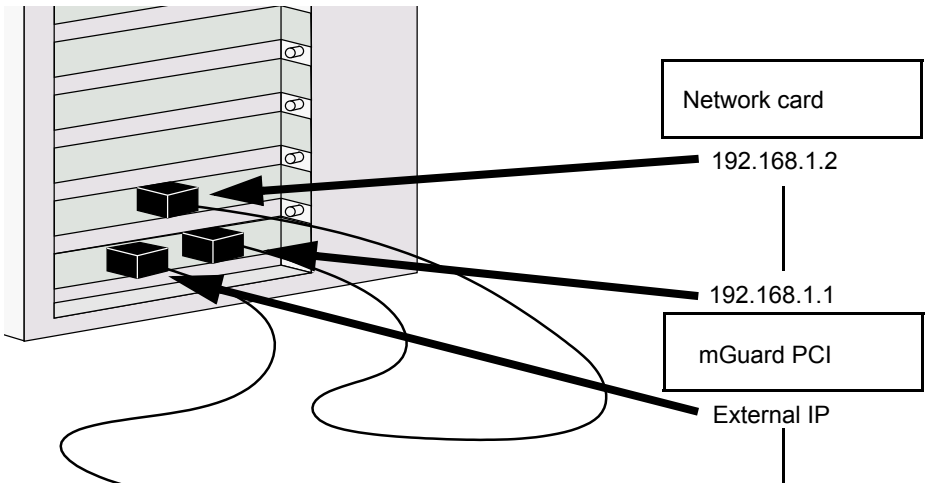


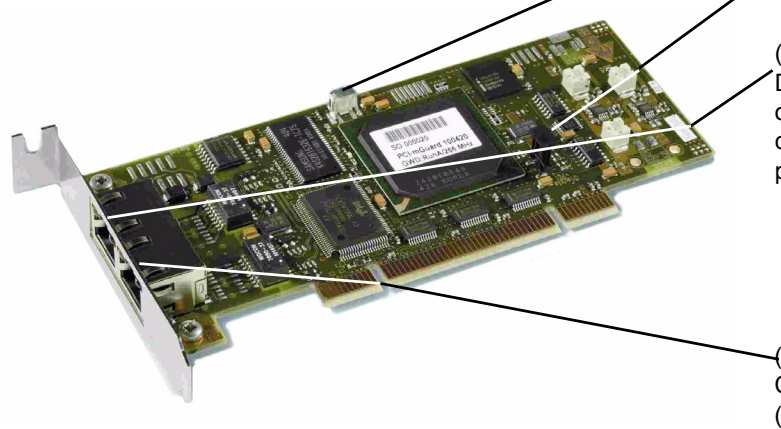
Fig. 4-20 Power-over-PCI mode: Router mode

If the mGuard is in *Router* mode (or *PPPoE* or *PPTP* mode), then the mGuard and the network card connected to its LAN socket (installed on the same computer or on another one) function as an individual network.

This means the following for the IP configuration of the network interface on the operating system of the computer on which the network card is installed: This network interface must be assigned an IP address that is different to the internal IP address of the mGuard (factory default – 192.168.1.1).

A third IP address is used for the mGuard interface to the WAN. The connection to an external network (e.g. Internet) is made via this IP address.

4.9.3 Hardware installation



(1) Rescue button

(2) Jumper for activating / deactivating the driver mode

(3) LAN port
Deactivated in driver mode. In Power-over-PCI mode, the network card is connected to the same (or another) protected computer or network.

(4) WAN port
Connections to the external network (e.g. Internet) are established over this interface. Incoming connections are blocked here according to the firewall default settings.
Use a UTP cable (CAT 5).

ATTENTION: Electrostatic discharge!

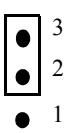
Before handling the mGuard PCI, touch the bare metal case of the PC to discharge the build-up of static electricity in your body.

The module contains components that may be damaged or destroyed due to electrostatic discharge. When handling the module, observe the necessary safety measures against electrostatic discharge (ESD) according to EN 61340-5-1 and EN 61340-5-2.

4.9.4 mGuard PCI: Setup

- Configure the mGuard PCI for *Driver mode* or *Power-over-PCI mode* (see “Selection of Driver mode or Power-over-PCI mode” on page 4-23).
- To enable the required mode, set the jumper (2) to the following positions:

Driver mode



Power-over-PCI mode

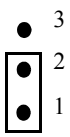


Fig. 4-21 Jumpers for Driver mode or Power-over-PCI mode

- Turn off the power to the computer and any other connected peripheral devices.
- Observe the safety instructions regarding electrostatic discharge.

- Unplug the power cable.
- Open the computer cover (please consult your computer manual).
- Select a free PCI slot (3.3 V or 5 V) for the mGuard PCI.
- Remove the relevant slot plate by loosening the holding screw and pulling it out.
  Keep this screw safe for securing the mGuard PCI card after installation.
- Carefully align the connection plug board of the mGuard PCI card with the selected PCI slot on the motherboard, then push the card down evenly.
- Tighten the card slot plate.
- Close the computer cover.
- Reconnect the power cable and turn on the computer.

4.9.5 Driver installation

Installation of the driver is only necessary when the mGuard PCI is operating in *Driver mode* (see “Driver mode” on page 4-23).

Requirements

- Please first complete the steps described under “Hardware installation” on page 4-27, if not done so already.
- You have the driver files on a data carrier.

If this is not the case:

- Download the driver files from the corresponding download area under www.innominate.com.
- Unpack the ZIP archive.
- Copy the unpacked files onto a data carrier (e.g. CD, USB memory stick).

In Windows XP

- After installing the hardware, switch on the computer.
- Logon as the administrator and wait until the following window appears:

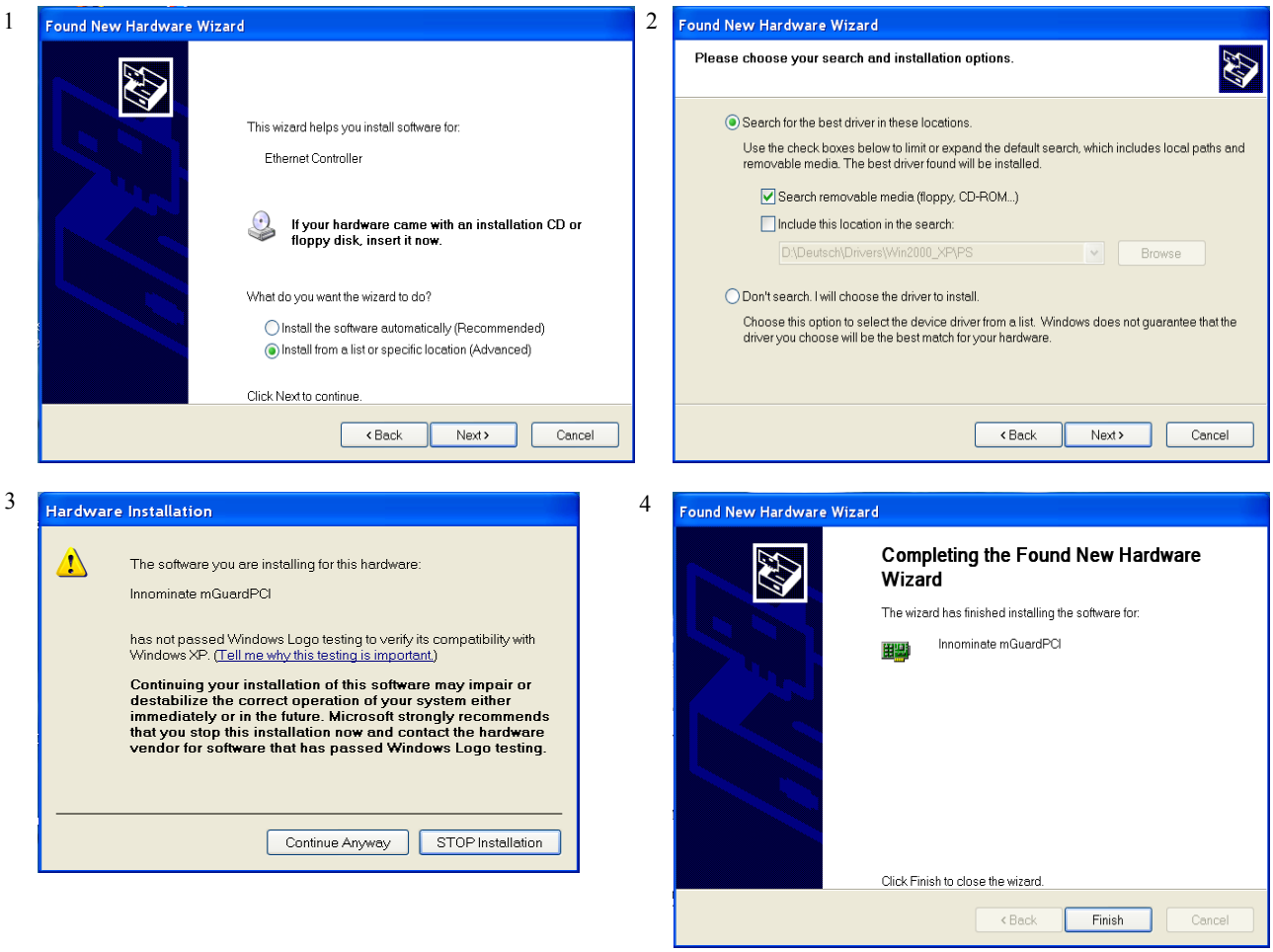

1
Found New Hardware Wizard
This wizard helps you install software for:
Ethernet Controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel
2
Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\Deutsch\Drivers\Win2000_XP\PS
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel
3
Hardware Installation
The software you are installing for this hardware:
Innominate mGuardPCI
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation
4
Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
Innominate mGuardPCI
Click Finish to close the wizard.
< Back
Finish
Cancel

Fig. 4-22 Driver installation in Windows XP

1. After inserting the data carrier, choose “Install from a list or specific location (Advanced)” and click on “Next”.
2. Click on “Next”.
3. Click on “Continue Anyway”.
4. Click on “Finish”.

In Windows 2000

- After installing the hardware, switch on the computer.
- Logon as the administrator and wait until the following window appears:

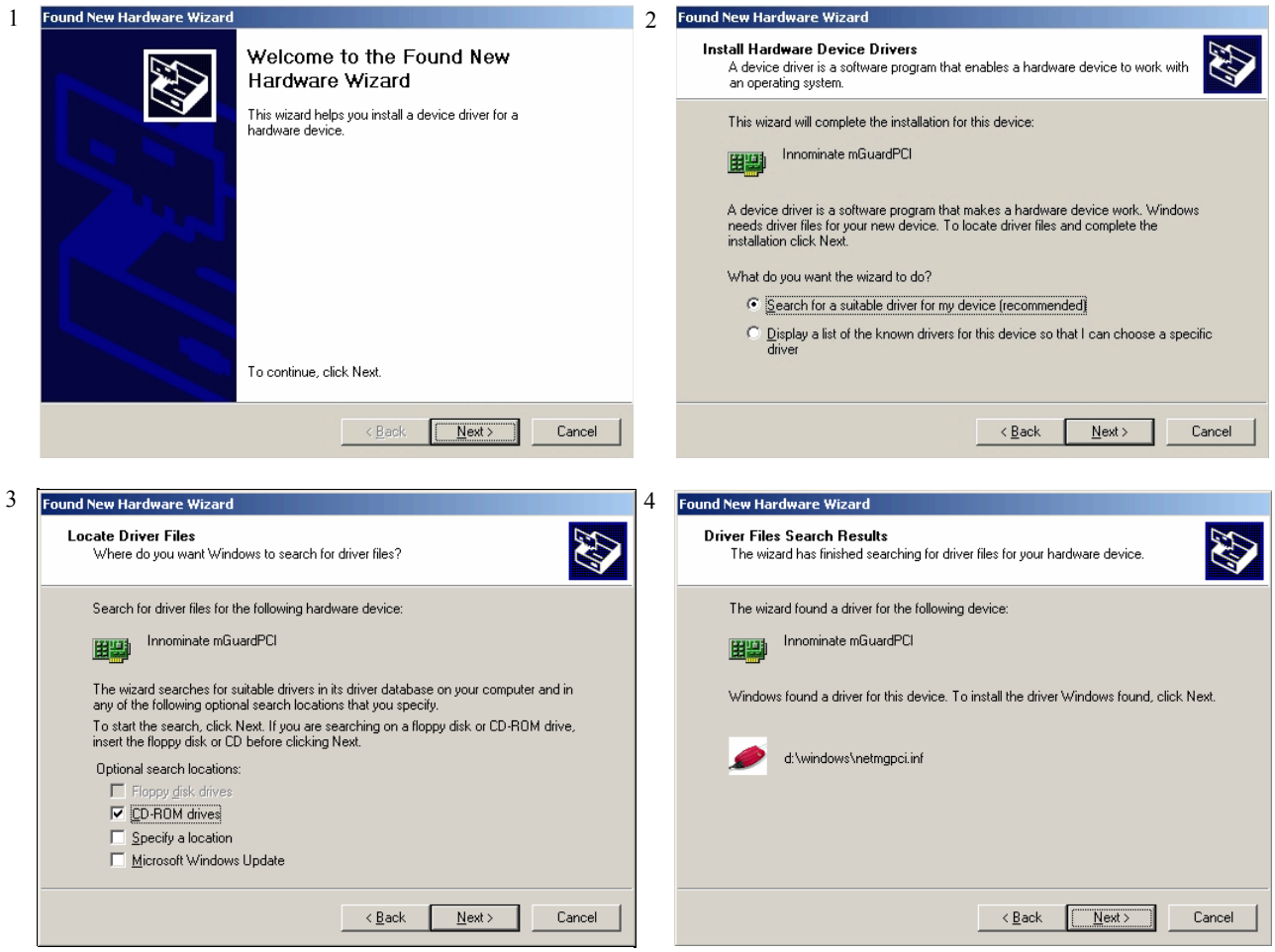

1
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel
2
Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
Innominate mGuardPCI
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel
3
Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
Innominate mGuardPCI
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel
4
Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
Innominate mGuardPCI
Windows found a driver for this device. To install the driver Windows found, click Next.
d:\windows\netmgpci.inf
< Back
Next >
Cancel

Fig. 4-23 Driver installation in Windows 2000 (1)

1. Click on “Next”.
2. Select “Search for a suitable driver for my device (recommended)” and click on “Next”.
3. Select “Specify a location” and click on “Next”.
4. Click on “Next”.

5

Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Innominate mGuardPCI
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

6

Fig. 4-24 Driver installation in Windows 2000 (2)

5. Click on “Yes”.
6. Click on “Finish”.

In Linux

The Linux driver is available as a source archive and must be compiled before usage:

- First set up and compile the Linux kernel (2.4.25) in the /usr/src/linux directory.
- Unpack the driver from the ZIP archive to /usr/src/pci-driver.
- Execute the following commands:

  ```
  cd /usr/src/pci-driver
  make LINUXDIR=/usr/src/linux
  install -m0644 mguard.o /lib/modules/2.4.25/kernel/drivers/net/
  depmod -a
  ```

- The driver can now be loaded using the following command:
  `modprobe mguard`

5 Preparing the Configuration

5.1 Connection requirements

mGuard centerport

- When using the mGuard centerport, both power supply units must be connected to the mains power or the power source. If only one power supply unit is connected, then the device can be operated. However, an acoustic signal is also emitted.
- **For local configuration:** The computer used for configuration must be connected to the LAN socket of the mGuard.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

mGuard industrial RS

- The mGuard industrial RS must be connected to at least one active power supply unit.
- **For local configuration:** The computer used for configuration must be connected to the LAN socket of the mGuard.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

mGuard smart

- The mGuard smart must be switched on (i.e. connected to an active system or power supply unit via the USB cable) in order for it to be supplied with power.
- **For local configuration:** The computer used for configuration must either be
  - connected to the LAN port of the mGuard
  - or connected to the mGuard via the local network.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

mGuard PCI

- **For local configuration:** The computer used for configuration must fulfill the following requirements:
  - **mGuard in** *Driver mode*: The mGuard PCI driver must be installed on the computer.
  - **mGuard in** *Power-over-PCI mode*: The computer must be connected to the mGuard LAN port or connected to the mGuard over the local network.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

mGuard blade

- The mGuard blade must be installed inside the mGuard bladeBase, and at least one of the bladeBase power supply units must be on.

- **For local configuration:**The computer used for configuration must either be
  - connected to the LAN socket of the mGuard
  - or connected to the mGuard via the local network.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

EAGLE mGuard

- The EAGLE mGuard must be connected to at least one active power supply unit.
- **For local configuration:** The computer used for configuration must either be
  - connected to the LAN socket of the mGuard
  - or connected to the mGuard via the local network.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

mGuard delta

- The mGuard delta must be connected to its power supply.
- **For local configuration:** The computer used for configuration must either be
  - connected to the mGuard LAN switch (Ethernet socket 4 to 7)
  - or connected to the mGuard via the local network.
- **For remote configuration:** The mGuard must be configured to permit remote configuration.
- The mGuard must be connected (i.e. the required connections must be working).

5.2 Local configuration at startup

The mGuard is configured using the web browser running on the configuration system (e.g. Mozilla Firefox (from version 1.5), MS Internet Explorer (from version 5.0) or Safari).

ATTENTION: The web browser must support SSL (i.e. HTTPS).

According to the factory defaults, the mGuard is accessible under the following address:

Table 5-1 Preset addresses

Factory default		
mGuard centerport	Router mode	https://192.168.1.1/
mGuard industrial RS	Stealth mode	https://1.1.1.1/
mGuard smart	Stealth mode	https://1.1.1.1/
mGuard PCI	Stealth mode	https://1.1.1.1/
mGuard blade	Stealth mode	https://1.1.1.1/
mGuard blade controller	Router mode	https://192.168.1.1/
EAGLE mGuard	Stealth mode	https://1.1.1.1/
mGuard delta	Router mode	https://192.168.1.1/

5.2.1 Configuring the mGuard at startup (default: Stealth mode)

For initial configuration of the mGuard PCI, see “Configuring the mGuard PCI at startup” on page 5-6.

With a configured network interface

In order to access the mGuard via the address https://1.1.1.1/, it must be connected to a configured network interface. This is the case if it is inserted into an existing network connection (see Fig. 4-11 on page 4-16).

In this case, the web browser can establish a connection to the mGuard configuration interface after the address is entered as https://1.1.1.1/ (see “Setting up a local configuration connection” on page 5-8). Continue from this point.

With a non-configured network interface

If the computer’s network interface has not been configured

If the configuration system was not previously connected to a network (e.g. because the computer is new), then its network interface is not usually configured. This means that the computer does not yet “know” that network traffic is handled by this interface.

In this case, you must initialize the default gateway by assigning it a dummy value. To do this, proceed as follows:

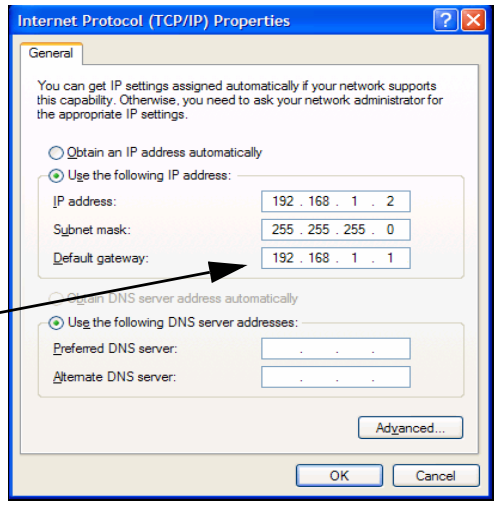
Initializing the default gateway

Determine the currently valid default gateway address.
If you are using Windows XP:

- Click on “Start, Control Panel, Network Connections”.
- Right-click on the icon of the LAN adapter so that the pop-up menu appears.
- Click on “Properties”.
- Switch to the “General” tab page in the “Properties of local network LAN connections” dialog.

- Select “Internet Protocol (TCP/IP)” under “This connection uses the following items”.
- Then click on “Properties”, so that the following window is displayed:

Search for or set the IP address of the default gateway here.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
192 . 168 . 1 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

- Internet protocol properties (TCP/IP)

If no IP address has been entered as the default gateway in this dialog (e.g. because the “Obtain an IP address automatically” function has been activated), then enter the IP address manually.

- To do so, first select “Use the following IP address”, then enter the following addresses (example):

IP address:	192.168.1.2
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1

Do not under any circumstances assign an address such as 1.1.1.2 to the configuration system!

- On the DOS level (Start, Programs, Accessories, Command Prompt), enter the following:

  arp -s <IP of the default gateway> **00-aa-aa-aa-aa-aa**

  Example: You have determined or set the address of the default gateway as: 192.168.1.1. The command should then be:

  arp -s 192.168.1.1 00-aa-aa-aa-aa-aa
- To proceed with the configuration, establish the necessary configuration connection (see “Setting up a local configuration connection” on page 5-8).
- After setting the configuration, restore the original setting for the default gateway. To do this, either restart the configuration computer or enter the following command on the DOS level:

  arp -d

Depending on the configuration of the mGuard, it may then be necessary to change the network interface of the local computer or network accordingly.

5.2.2 Configuring the mGuard at startup (default: Router mode)

After initial delivery, resetting to the factory defaults or flashing the mGuard, the mGuard is found on the LAN interface under the address 192.168.1.1 within the network 192.168.1.0/24 (mGuard delta is found on the LAN interfaces 4 to 7). You may need to adjust the configuration of your computer to access the configuration interface.

If you are using **Windows XP**:

- Click on “Start, Control Panel, Network Connections”.
- Right-click on the icon of the LAN adapter so that the pop-up menu appears.
- Click on “Properties”.
- Select the “General” tab page in the “Properties of local network LAN connections” dialog.
- Select “Internet Protocol (TCP/IP)” under “This connection uses the following items”.
- Then click on “Properties”, so that the following window is displayed:

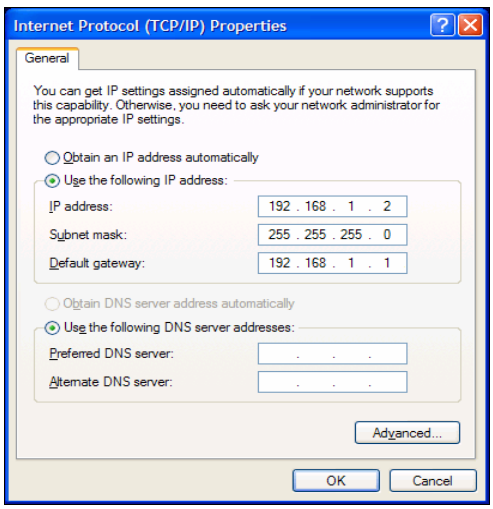

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 1 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 1 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Fig. 5-1 Internet protocol properties (TCP/IP)

- First select “Use the following IP address”, then enter the following addresses (example):

IP address:	192.168.1.2
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1

Depending on the configuration of the mGuard, it may then be necessary to change the network interface of the local computer or network accordingly.

5.2.3 Configuring the mGuard PCI at startup

Installing the PCI card

- If the PCI card has not yet been installed in your computer, please first follow the steps described under “Hardware installation” on page 4-27.

Installing the driver

- If you have configured the mGuard to run in **Driver mode**, ensure that the drivers are installed as described under “Driver installation” on page 4-28.

Configuring the network interface

If you operate the mGuard

– in **Driver mode**, and the LAN interface (i.e. network interface of the computer) has not been configured yet, or

– in **Power-over-PCI mode** and the network interface of the computer connected to mGuard LAN interface has not yet been configured,

then this network interface must be configured before you can configure the mGuard.

If you are using **Windows XP**:

- Click on “Start, Control Panel, Network Connections”.
- Right-click on the icon of the LAN adapter so that the pop-up menu appears. Click on “Properties”.
- Select the “General” tab page in the “Properties of local network LAN connections” dialog.
- Select “Internet Protocol (TCP/IP)” under “This connection uses the following items”.
- Then click on “Properties”, so that the following window is displayed:

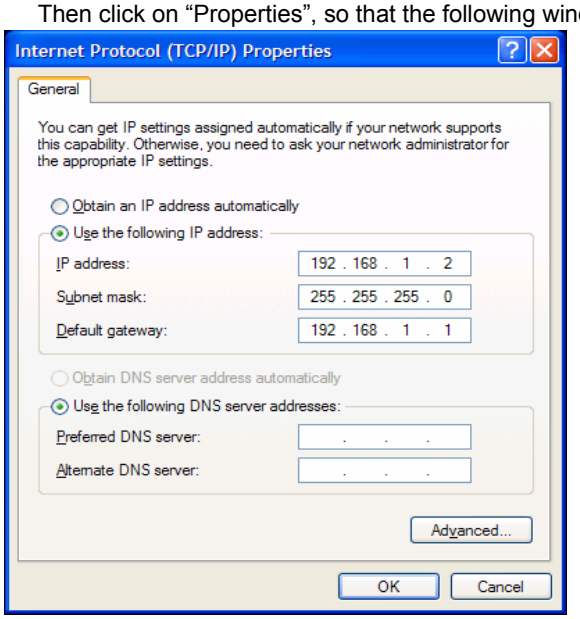

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
192 . 168 . 1 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Fig. 5-2 Internet protocol properties (TCP/IP)

Default gateway

After you have configured the network interface, you can access the mGuard configuration interface using a web browser under the URL https://1.1.1.1/.

If this is not possible, then the default gateway of the computer may not be available. In this case you must simulate the process as follows:

Initializing the default gateway

Determine the currently valid default gateway address.

- If you are using **Windows XP**, follow the steps described above (under “Configuring the network interface” on page 5-6) to open the “Internet Protocol (TCP/IP) Properties” dialog.
- If no IP address has been entered as the default gateway in this dialog (e.g. because the “Obtain an IP address automatically” function has been activated), then enter the IP address manually.

  To do so, first select “Use the following IP address”, then enter the following addresses (example):

IP address:	192.168.1.2	Do not under any circumstances assign an address such as 1.1.1.2 to the configuration system!
Subnet mask:	255.255.255.0	
Default gateway:	192.168.1.1	

- On the DOS level (Start, Programs, Accessories, Command Prompt), enter the following:

  arp -s `<IP of the default gateway>` **00-aa-aa-aa-aa-aa**

  Example:

  You have determined or set the address of the default gateway as: 192.168.1.1

  The command should then be:

  arp -s 192.168.1.1 00-aa-aa-aa-aa-aa
- To proceed with the configuration, establish the necessary configuration connection (see “Setting up a local configuration connection” on page 5-8).
- After setting the configuration, restore the original setting for the default gateway. To do this, either restart the configuration computer or enter the following command on the DOS level:

  arp -d

Depending on the configuration of the mGuard, it may then be necessary to change the network interface of the local computer or network accordingly.

5.3 Setting up a local configuration connection

Web-based administrator interface

The mGuard is configured using the web browser running on the configuration system (e.g. Firefox, MS Internet Explorer or Safari).

ATTENTION: The web browser must support SSL (i.e. HTTPS).

Depending on the model, the mGuard is delivered either in *Stealth* or *Router* mode and is therefore available under one of the following addresses:

Table 5-2 Preset addresses

Factory default		
mGuard centerport	Router mode	https://192.168.1.1/
mGuard industrial RS	Stealth mode	https://1.1.1.1/
mGuard smart	Stealth mode	https://1.1.1.1/
mGuard PCI	Stealth mode	https://1.1.1.1/
mGuard blade	Stealth mode	https://1.1.1.1/
mGuard blade controller	Router mode	https://192.168.1.1/
EAGLE mGuard	Stealth mode	https://1.1.1.1/
mGuard delta	Router mode	https://192.168.1.1/

Proceed as follows:

- Start the web browser.
  (e.g. Firefox, MS Internet Explorer or Safari; the web browser must support SSL (i.e. HTTPS)).
- Ensure that the browser does not automatically dial a connection at startup, as this could make it more difficult to establish a connection to the mGuard.

In **MS Internet Explorer**, make this setting as follows:

- In the “Extras” menu, select “Internet Options...” and click on the “Connections” tab page:
- “Never dial a connection” must be selected under “Dial-up and Virtual Private Network settings”.
- Enter the complete address of the mGuard in the address field of the browser (see Table 5-2).

The mGuard administrator website is then accessed.

If the mGuard administrator website is not accessed

If you have forgotten the configured address

If the address of the mGuard (in *Router*, *PPPoE* or *PPTP* mode) has been changed and the current address is unknown, you must use the **recovery** procedure to reset the mGuard IP address factory defaults as entered above (see “Performing a recovery procedure” on page 7-2).

If the administrator website is not displayed

If the web browser repeatedly reports that the page cannot be displayed, try the following:

- Check whether the default gateway has been initialized on the connected configuration system (see “Local configuration at startup” on page 5-3).
- Disable any active firewalls.
- Ensure that the browser does not use a proxy server.

In **MS Internet Explorer** (version 6.0), make this setting as follows: In the “Extras” menu, select “Internet Options...” and click on the “Connections” tab page.
Click on “Properties” under “LAN settings”.
Check that “Use a proxy server for your LAN” (under proxy server) is not activated in the “Local Area Network (LAN) Settings” dialog.

- If any other LAN connection is active on the system, deactivate it until configuration has been completed.
  Under the Windows menu “Start, Settings, Control Panel, Network Connections” or “Network and Dial-up Connections”, right-click on the corresponding icon and select “Disable” in the pop-up menu.

After a successful connection setup

After a connection has been successfully set up, the following security notice is displayed (MS Internet Explorer):

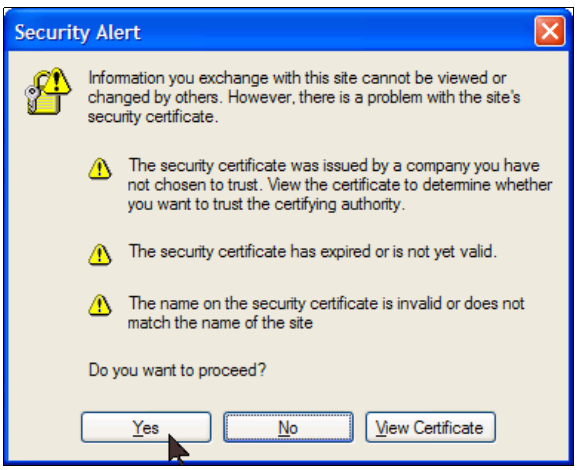

Security Alert
Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.
The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.
The security certificate has expired or is not yet valid.
The name on the security certificate is invalid or does not match the name of the site
Do you want to proceed?
Yes
No
View Certificate

Fig. 5-3 Security notice

Explanation:

As administrative tasks can only be performed when secure (encrypted) access to the device has been established, a self-signed certificate is supplied.

- Acknowledge the corresponding security notice by clicking on “Yes”.

The login window is displayed.

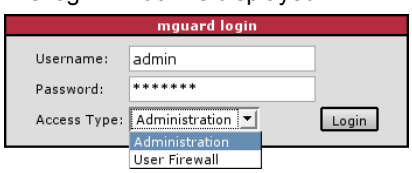


Fig. 5-4 Login

- Choose the access type (Administration or User Firewall) and enter your username and password for this access type. For the user firewall, see “Network Security >> User Firewall” on page 6-141.

The factory defaults for administration purposes are as follows (pay attention to capitalization):

Login:	admin
Password:	mGuard

To configure the device, make the desired or necessary entries on the individual pages of the mGuard interface (see “Configuration” on page 6-1).

For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration (see “Authentication >> Local Users” on page 6-108).

5.4 Remote configuration

Requirement

The mGuard must be configured to permit remote configuration.

Remote configuration is disabled by default.

To enable remote configuration, see “Management >> Web Settings” on page 6-18 and “Access” on page 6-19.

Procedure

To configure the mGuard from a remote computer using the web interface, first establish a connection to the mGuard from there.

Proceed as follows:

- Start the web browser on the remote computer (e.g. Firefox, MS Internet Explorer or Safari; the web browser must support HTTPS).
- Under address, enter the IP address where the mGuard is available externally over the Internet or WAN, together with the port number (if required).

Example

If this mGuard is accessible over the Internet at the address https://123.45.67.89/ and port number 443 has been set for remote access, then you need to enter the following address in the web browser on the remote peer: https://123.45.67.89/

If another port number is used, it is entered behind the IP address, e.g.: https://123.45.67.89:442/

Configuration

- To configure the device, make the desired or necessary entries on the individual pages of the mGuard interface (see “Configuration” on page 6-1).

6 Configuration

6.1 Operation

You can click on the desired configuration on the left-hand menu, e.g. “Management, Licensing”.

The page is then displayed in the main window – usually as one or more tab pages – on which you can make the settings. If the page is organized into several tab pages, you can scroll through them using the *tabs* at the top.

Working with tab pages

– You can make the desired entries in the corresponding tab page (see also “Working with sortable tables” on page 6-1).

– To save the settings on the device, you must click on the **Apply** button.
After the settings have been saved by the system, you will see a confirmation message. This indicates that the new settings have taken effect. They also remain valid after a restart (reset).

– You can return to a previously accessed page by pressing the **Back** button at the bottom right, if available.

Entry of inadmissible values

If you enter an inadmissible value (for example, an inadmissible number in an IP address) and click on **Apply**, the relevant tab page title is displayed in red. This helps in tracking down the error.

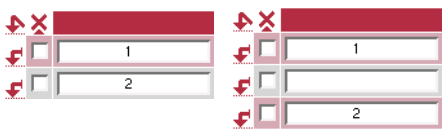
Working with sortable tables

Many settings are saved as data records. Accordingly, the adjustable parameters and their values are presented as table rows. If several data records have been set (e.g. firewall rules), these will be queried or processed based on the entry sequence from top to bottom. Therefore, pay attention to the order of the entries, if necessary. The sequence can be changed by moving table rows upwards or downwards.

With tables, you can carry out the following actions:

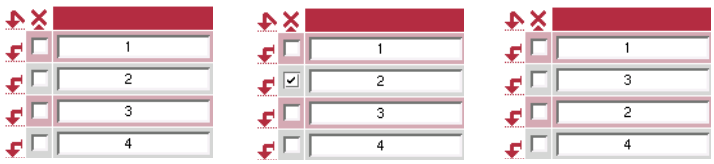
– Insert rows (sets up a new data record with settings (e.g. the firewall rules for a specific connection))
– Move rows (sorts them to another location)
– Delete rows (deletes the entire data record)

Inserting rows



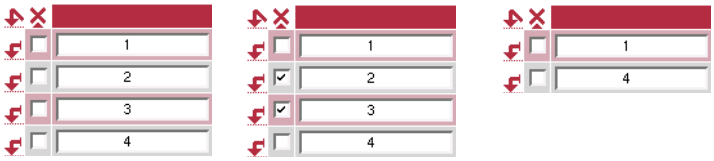
1. Click on the arrow where you want to insert a new row.
2. The new row is inserted.
You can now enter or specify values in the row.

Moving rows



1. Select the row(s) you want to move.
2. Click on the arrow where you want to move the selected rows to.
3. The rows are moved.

Deleting rows



1. Select the rows you want to delete.
2. Click on the symbol to delete the rows:
3. The rows are deleted.

Working with non-sortable tables

Tables are non-sortable when the sequence of the data records contained within does not play any technical role. It is then not possible to insert or move rows. With such tables, you can carry out the following actions:

– Delete rows

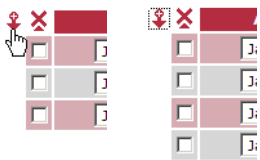
– Append rows to the end of the table in order to create a new data record and settings (e.g. user firewall templates)

The symbols for inserting a new table row are therefore different:

– For appending rows to **non-sortable** tables:

– For inserting rows in sortable tables:

Appending rows (non-sortable tables)



1. Click on the arrow to append a new row.
2. The new row is appended under the existing table.
   You can now enter or specify values in the row.

Buttons

The following buttons are located at the top of every page:

Logout

For logging out after configuration access to the mGuard.

If the user does not conduct a logout procedure, the logout is automatically made when activities have stopped and the defined time limit has expired. Renewed access is only granted after the login process has been repeated.

Reset

Optional button.

Resets data to the original values. If you have entered values on a configuration page and these have not yet been applied (**Apply** button), you can restore the original values on the page by clicking the **Reset** button.

This button can only be seen at the top of the page if the validity range of the **Apply** button is set to *"Include all pages"* (see "Management >> Web Settings" on page 6-18).

Apply

Optional button.

Has the same functions as the **Apply** button, but is valid for all pages.

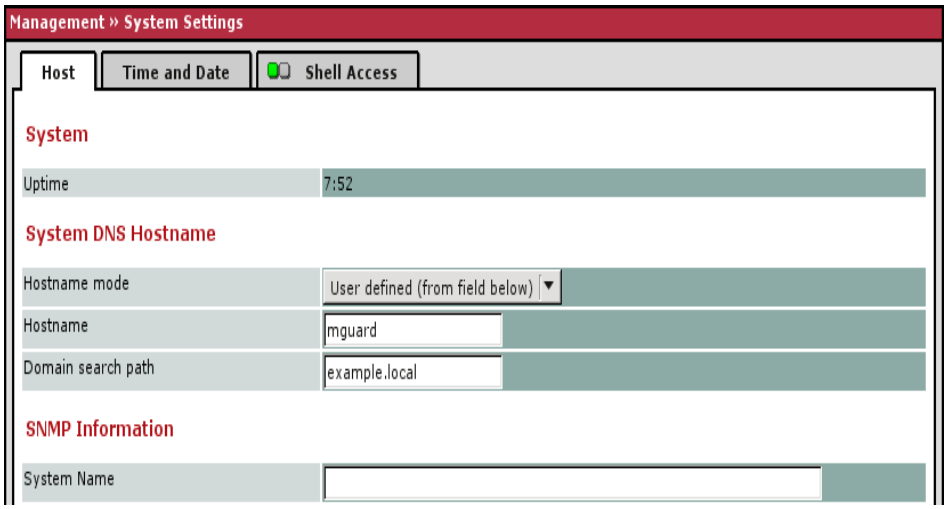
This button can only be seen at the top of the page if the validity range of the **Apply** button is set to *"Include all pages"* (see "Management >> Web Settings" on page 6-18).

6.2 Management menu

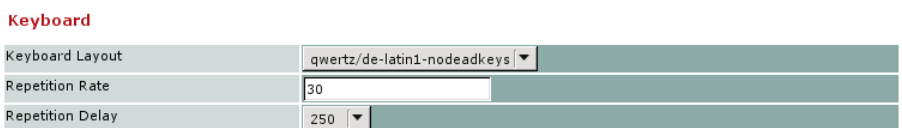
For security reasons, we recommend that you change the default Root and Administrator passwords during the first configuration (see “Authentication >> Local Users” on page 6-108). You will be informed of this as long as passwords are left unchanged.

6.2.1 Management >> System Settings

6.2.1.1 Host

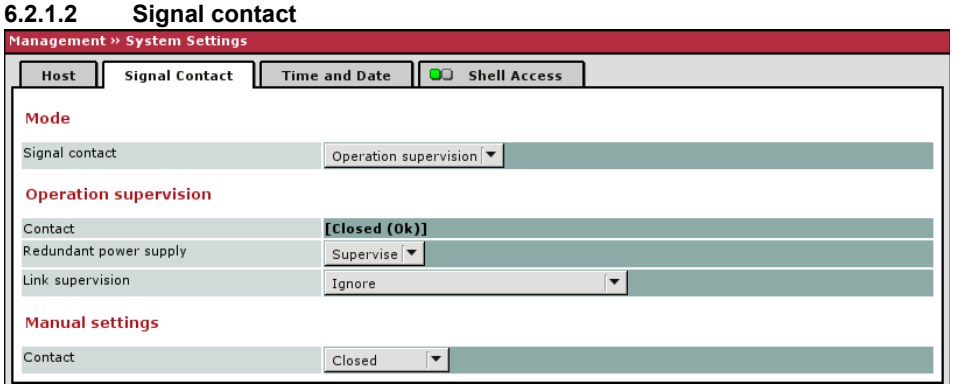


Management >> System Settings >> Host		
System		
	Uptime	Current system running time since the last reboot.
	(only mGuard centerport, mGuard industrial RS, EAGLE mGuard)	
	Power supply 1/2	State of both power supply units.
	Temperature (°C)	An SNMP trap is sent if the temperature exceeds or falls below the defined temperature range.

Management >> System Settings >> Host (continued)		
System DNS Hostname	**Hostname mode**	You can assign a name to the mGuard using the *Hostname mode* and *Hostname* fields. For example, this is then displayed when logging in via SSH (see “Management >> System Settings” on page 6-4, “Shell Access” on page 6-11). Assigning names simplifies the administration of several mGuards. **User defined (from field below)** (Default) The name entered in the “Hostname” field is assigned to the mGuard. If the mGuard is running in *Stealth* mode, the “User defined” option must be selected under “Hostname mode”. **Provider defined (e.g. via DHCP)** If the selected network mode permits external setting of the hostname (e.g. via DHCP), the mGuard is assigned the name received from the provider.
	Hostname	If the “User defined” option is selected under “Hostname mode”, enter the name that should be assigned to the mGuard here. Otherwise, the entry in this field will be ignored (i.e. if the “Provider defined” option (e.g. via DHCP) is selected under “Hostname mode”).
	Domain search path	This option makes it easier for the user to specify a domain name. If the user enters the domain name in an abbreviated form, the mGuard completes the entry by appending the domain suffix that is defined here under the “Domain search path”.
SNMP Information	**System Name**	A freely selectable name for the mGuard, used for administration purposes (e.g. “Hermes”, “Pluto”) (under SNMP: sysName).
	Location	Freely selectable description of the installation location (e.g. “hall IV”, “corridor 3”, “broom cupboard”) (under SNMP: sysLocation).
	Contact	The name of the contact person responsible for this mGuard, including telephone number (under SNMP: sysContact).
Keyboard	**(mGuard centerport only)**	
	Keyboard Layout	Selection list for choosing the appropriate keyboard layout.
	Repetition Rate	Specifies how many characters the keyboard generates per second when the same key is held down (default: 30).

Management >> System Settings >> Host (continued)		
	Repetition Delay	Specifies how long a key on the keyboard must be held down until the repeat function is activated. Generation of the number of characters per second as specified above under **Repetition Rate** (default: 250.)
HiDiscovery		HiDiscovery is a protocol which supports the initial startup of new network devices and is available in *Stealth* mode on the local interface (LAN) of the mGuard.
	Local HiDiscovery Support	**Enabled** HiDiscovery protocol is activated. **Read only** HiDiscovery protocol is activated, but the mGuard cannot be configured using it. **Disabled** HiDiscovery protocol is deactivated.
	HiDiscovery Frame Forwarding Yes / No	If this option is set to **Yes**, then HiDiscovery frames are forwarded from the internal (LAN) port externally over the WAN port.

6.2.1.2 Signal contact

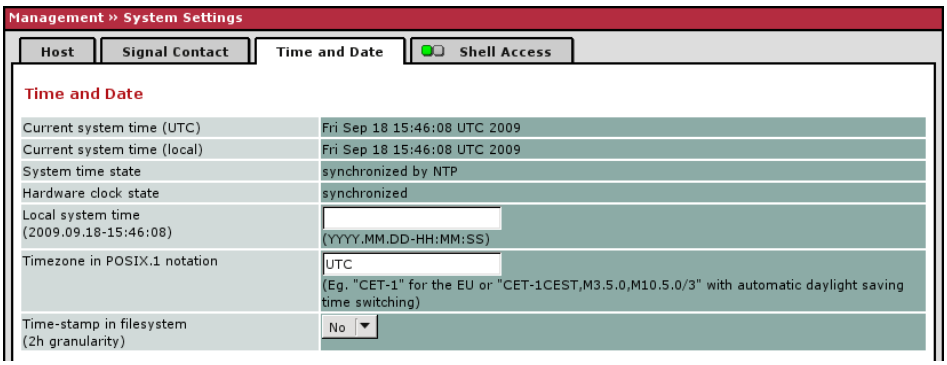


The signal contact is a relay which is used by the mGuard to signal error conditions (see also “Signal contact” on page 4-13 and “Signal contact” on page 4-20).

Management >> System Settings >> Signal Contact		
Mode	(only mGuard industrial RS, EAGLE mGuard)	
	Signal contact	The signal contact can be controlled automatically by the mGuard using **Operation supervision** (default) or **Manual settings**. See also: “Installing the mGuard industrial RS” on page 4-9 and “Installing the EAGLE mGuard” on page 4-19.
Operation supervision	**Contact**	Displays the state of the signal contact. Either **Open (Error)** or **Closed (OK)**.

Management >> System Settings >> Signal Contact (continued)		
	Redundant power supply	If set to **Ignore**, the power supply does not influence the signal contact. If set to **Supervise**, the signal contact is opened if one of the two power supplies fails.
	Link supervision	Supervision of the Ethernet interface link state. Possible settings are: – Ignore – Supervise internal only (trusted) – Supervise external only (untrusted) – Supervise both
Manual settings	**Contact**	If the **Signal contact** is set to **Manual setting** above, this option sets the contact to **Closed** or **Open (Alarm)**.

6.2.1.3 Time and Date



Management >> System Settings >> Time and Date		
Time and Date	**Current system time (UTC)**	Displays the current system time in Universal Time Coordinates (UTC). If **NTP time synchronization** is not yet activated (see below) and **Time-stamp in filesystem** is deactivated, the clock will start at January 1st 2000.
	Current system time (local)	Display: If the (sometimes different) current local time should be displayed, you must make the corresponding entry under **Timezone in POSIX.1 notation...** (see below).
	System time state	Display: Displays whether the system time and run time of the mGuard have ever actually been synchronized with a valid time. If the system time of the mGuard has not been synchronized, then the mGuard does not perform any time-controlled activities. These are as follows:

Management >> System Settings >> Time and Date (continued)

– **Time-controlled pick-up of configuration from a configuration server:**
This is the case when the *Time Schedule* setting is selected under the *Management >> Central Management*, *Configuration Pull* menu for the **Pull Schedule** setting (see “Management >> Configuration Profiles” on page 6-34, “Configuration Pull” on page 6-47).

– **Interruption of the connection at a certain time using the PPPoE network mode:**
This is the case when the **Network Mode** is set to PPPoE under the *Network >> Interfaces, General* menu, and the **Automatic Reconnect** is set to Yes (see 6.4.1 “Network >> Interfaces”, “Network Mode = Router, Router Mode = PPPoE” on page 6-76).

– **Acceptance of certificates when the system time has not yet been synchronized:**
This is the case when the *Wait for synchronization of the system time* setting is selected under the Authentication >> Certificates, *Certificate settings* menu for the **Check the validity period of certificates and CRLs** option (see Chapter 6.5.3 and “Certificate settings” on page 6-118).

The system time can be synchronized by various events:

– The mGuard possesses an installed clock which is synchronized with the current time at least once. The mGuard only has a clock when the **Hardware clock state** option is visible. The display shows whether the clock is synchronized. A synchronized, installed clock ensures that the mGuard has a synchronized system time, even after rebooting.

– The administrator has defined the current time for the mGuard run time by making a relevant entry under **Local system time**.

– The administrator has set the **Time-stamp in filesystem** to *Yes*, and has either transmitted the current system time to the mGuard by NTP (see below under *NTP Server*) or has entered it under **Local system time**. The system time of the mGuard is then synchronized using the time stamp after rebooting (even if it has no installed clock and is set exactly again afterwards using NTP).

– The administrator has activated NTP time synchronization under **NTP Server**, has entered the address of at least one NTP server, and the mGuard has opened connections with at least one of the defined NTP servers. If the network is working correctly then this occurs seconds after rebooting. The display in the **NTP State** field may only change to “synchronized” much later (see the explanation below under **NTP State**).

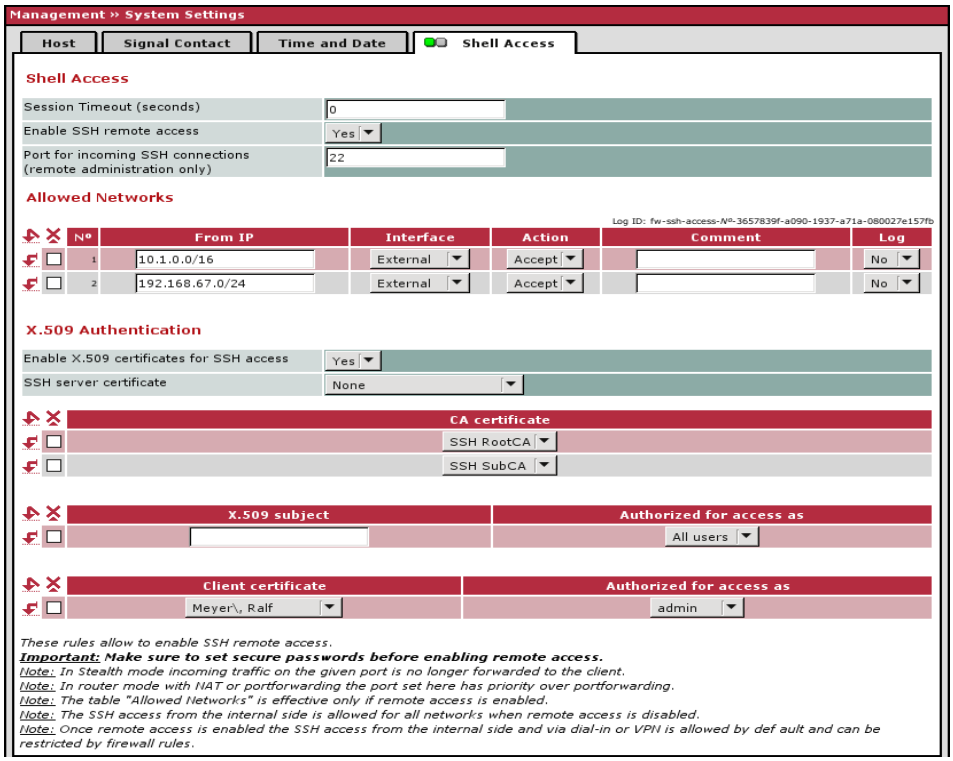
Hardware clock state (for mGuard industrial RS and mGuard delta)

The state of the installed clock is only visible when the mGuard possesses a clock that also runs when the system is turned off or has no power supply. The display shows if the clock has been synchronized with the current time. The installed clock is only synchronized when the system time of the mGuard is synchronized. Once the clock has been synchronized, its state only returns to “not synchronized” if the firmware is reinstalled on the device (see Chapter 7.3, “Flashing the firmware / rescue procedure”) or if the condenser (mGuard industrial RS) or the battery (mGuard delta) did not supply the installed clock with sufficient voltage for a period with the device switched off.

Management >> System Settings >> Time and Date (continued)		
	Local system time	Here you can set the mGuard time if no NTP server has been specified (see below) or the NTP server is not available. The date and time are specified in the format YYYY.MM.DD-hh:mm:ss: YYYY Year MM Month DD Day hh Hour mm Minute ss Second
	Timezone in POSIX.1 notation...	If the *Current system time* above should display a current local time that is different to Greenwich Mean Time, then you must enter the number of hours that your local time is in front of or behind Greenwich Mean Time. **Examples:** In Germany, the time is one hour after GMT. Therefore, enter: CET-1. In New York the time is five hours behind Greenwich Mean Time. Therefore, enter: CET+5. The only important thing is the -1, -2 or +1 value as only these are evaluated – not the preceding letters. They can be substituted with “CET” or any other designation, such as “UTC”. If you wish to display Central European Time (e.g. for Germany) and have it automatically switch to/from daylight saving time, enter: CET-1CEST,M3.5.0,M10.5.0/3
	Timestamp in filesystem (2h granularity): Yes / No	If this option is set to **Yes**, the mGuard will save the current system time in its memory every two hours. If the mGuard is switched off and then back on, a time from this two-hour time period is displayed, not a time on January 1, 2000.
NTP Server	(NTP – Network Time Protocol) The mGuard can function as an NTP server for computers connected at its LAN port. In this case, the computers are configured so that the local address of the mGuard is entered as the address of the NTP server. If the mGuard is operated in *Stealth* mode, the management IP address of the mGuard (if this is configured) must be used for the computers, or the IP address 1.1.1.1 must be entered as the local address of the mGuard. For the mGuard to function as an NTP server, it must get the current date and time from an NTP server (time server). In order to do this, the address of at least one NTP server must be entered. This feature must also be activated.	

Management >> System Settings >> Time and Date (continued)		
	Enable NTP time synchronization: Yes / No	Once the NTP is enabled, the mGuard obtains the date and time from one or more time server(s) and synchronizes itself with it or them. The initial time synchronization can take up to 15 minutes. During this period, the mGuard repeatedly compares the time entry in the external time server and its own “clock” in order to match them as closely as possible. Only then can the mGuard function as an NTP server for the computers connected at its LAN port and supply them with the system time. An initial time synchronization with the external time server is performed after every booting process, unless the mGuard has an installed clock (*mGuard industrial RS* and *mGuard delta*). After the initial time synchronization, the mGuard regularly compares the system time with the time servers. Fine-adjustments to the time are usually only made in the range of seconds.
	NTP State	Displays the current NTP state. Shows whether the NTP server running on the mGuard has synchronized with the configured NTP servers to a sufficient degree of accuracy. If the system clock of the mGuard has never been synchronized before activation of NTP time synchronization, then synchronization can take up to 15 minutes. However, the NTP server still changes the mGuard system clock to the current time after a few seconds, as soon as it has successfully contacted one of the configured NTP servers. The system time of the mGuard is then synchronized. Fine-adjustment of the time is usually only made in the second range.
	NTP Server	Enter one or more time servers from which the mGuard should obtain the current time. If you enter several time servers, the mGuard will automatically connect with all of them to determine the current time.

6.2.1.4 Shell Access



Displayed when *Enable X.509 certificates for SSH access* is set to **Yes**.

Management >> System Settings >> Shell Access	
Shell Access	When SSH remote access is enabled, the mGuard can be configured **from a remote system** using the command line interface. This option is disabled by default. **ATTENTION:** If remote access is enabled, ensure secure *root* and *administrator* passwords are defined. Make the following settings for SSH remote access: **Session Timeout (seconds)**: Specifies after how long (in seconds) the session is automatically ended when no action is taken (i.e. automatic logout). The setting “0” (factory default) means that no automatic session end is made. The value entered is also valid for shell access over the serial port. **Enable SSH remote access: Yes / No**: If you want to enable SSH remote access, then set this option to **Yes**. You can enable *Internal* SSH access (i.e. from the directly connected LAN or from the directly connected computer) independently of this switch setting. You must define the firewall rules for the available interfaces on this page under **Allowed Networks** in order to specify differentiated access possibilities to the mGuard.

Management >> System Settings >> Shell Access (continued)

Port for incoming SSH connections (remote administration only)

Default: 22

If this port number is changed, the new port number only applies for access over the *External, External 2, VPN* and *Dial-in* interface. Port number 22 still applies for internal access.

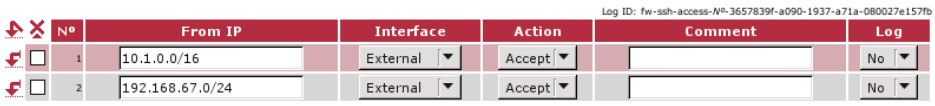
The remote peer that makes remote access may have to enter the port number defined here during the login procedure.

Example:

If this mGuard is accessible over the Internet under the address 123.124.125.21, and the default port number 22 has been set for remote access, you may not need to enter this port number in the address field on the SSH client (e.g. PuTTY or OpenSSH) of the remote peer.

If a different port number has been set (e.g. 2222), this must be specified, e.g.:
ssh -p 2222 123.124.125.21

Allowed Networks



Lists the firewall rules that have been set. These apply for incoming data packets of an SSH remote access attempt.

If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

The rules specified here only become effective if **Enable SSH remote access** is set to **Yes**. *Internal* access is also possible when this option is set to **No**. A firewall rule that would refuse *Internal* access is therefore not effective in this case.

You have the following options:

From IP

Enter the address of the system or network where remote access is permitted or forbidden in this field.

You have the following options:

IP address: **0.0.0.0/0** means all addresses. To enter an address, use CIDR notation – see “CIDR (Classless Inter-Domain Routing)” on page 6-213.

Management >> System Settings >> Shell Access (continued)

Interface

External / Internal / External 2 / VPN / Dial-in

External 2 and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

Specifies which interface the rules apply to.

If no rules are set, or if no rule takes effect, the following default settings apply:
SSH access is permitted over *Internal*, *VPN* and *Dial-in*. Access over *External* and *External 2* is refused.

Specify the access possibilities according to your requirements.

ATTENTION: If you want to refuse access over *Internal, VPN* or *Dial-in*, you must implement this explicitly through corresponding firewall rules, by specifying *Drop* as an action, for example.

To avoid locking yourself out, you may have to simultaneously allow access over another interface explicitly with *Accept* before you make the new setting effective by clicking the **Apply** button. Otherwise, if you are locked out, you must perform the recovery procedure.

Action

Possible settings:

– **Accept** means that data packets may pass through.
– **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. In *Stealth* mode, *Reject* has the same effect as *Drop*.
– **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.

Comment

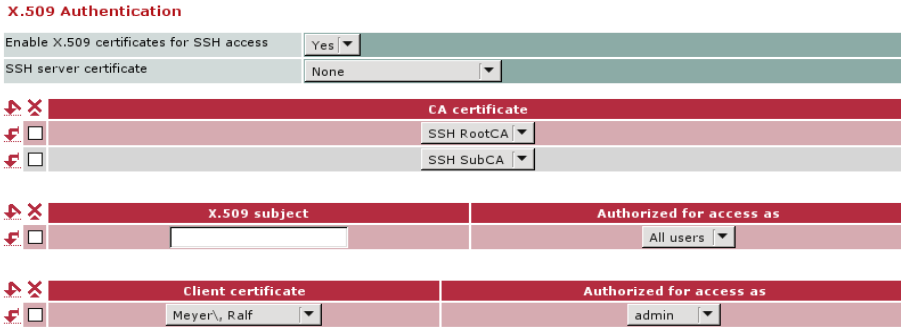
Freely selectable comment for this rule.

Log

For each individual firewall rule, you can specify whether the use of the rule

– should be logged (set *Log* to **Yes**) or
– should not be logged (set *Log* to **No** – factory default)

X.509 Authentication



Management >> System Settings >> Shell Access		

X.509 Authentication	**Enable X.509 certificates for SSH access: Yes / No**	– If **No** is selected, then only normal authentication procedures (user name and password or private and public keys) are allowed, not the X.509 authentication procedure.
		– If **Yes** is selected, then the X.509 authentication procedure can be used in addition to normal procedures (as seen under **No**).
		– When **Yes** is selected, the following points must be defined:
		  – How the mGuard authenticates itself to the SSH client according to X.509 (see **SSH server certificate (1)**)
		  – How the mGuard authenticates the remote SSH client according to X.509 (see **SSH server certificate (2)**)

	SSH server certificate (1)	**Specifies how the mGuard identifies itself to the SSH client.** Select one of the machine certificates from the list or the *None* entry. *None*: When *None* is selected, the SSH server of the mGuard does not authenticate itself to the SSH client via the X.509 certificate. Instead, it uses a server key and is thus compatible with older versions of the mGuard. If one of the machine certificates is selected, this is also offered to the SSH client. The client can then decide whether to use the normal authentication procedure or the procedure according to X.509. The selection list gives a selection of machine certificates that are loaded in the mGuard under the *Authentication* >> *Certificates* menu (see page 6-113).

Management >> System Settings >> Shell Access (continued)

SSH server certificate (2)

Specifies how the mGuard authenticates the SSH client

The following definition relates to how the mGuard verifies the authentication of the SSH client.

The table below shows which certificates must be provided for the mGuard to authenticate the SSH client if the SSH client displays one of the following certificate types on connection:

– A certificate signed by a CA
– A self-signed certificate
For further information on the following table, see Chapter 6.5.3, “Authentication >> Certificates”.

Authentication for SSH

The remote peer shows the following:	Certificate (specific to individual) **signed by CA**	Certificate (specific to individual) **self-signed**
The mGuard authenticates the remote peer using:	⇳	⇳
	All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer or ADDITIONALLY Remote certificates, **if** used as a filter	Remote certificate

In accordance with this table, the certificates must be provided that the mGuard uses for the authentication of the respective SSH client.

The following instructions assume that the certificates have already been correctly installed in the mGuard (see Chapter 6.5.3, “Authentication >> Certificates”).

If the use of block lists (CRL checking) is activated under the *Authentication >> Certificates, Certificate settings* menu, then each certificate signed by a CA that an SSH client presents is checked for blocks.

Management >> System Settings >> Shell Access

CA certificate

The configuration is only necessary when the SSH client displays a certificate signed by a CA.

All CA certificates required by the mGuard to form the chain to the respective root CA certificate with the certificates displayed by the SSH client must be configured.

The selection list shows the CA certificates that were loaded in the mGuard under the *Authentication >> Certificates* menu.

Management >> System Settings >> Shell Access (continued)

X.509 subject

Allows a filter to be set in relation to the contents of the *Subject* field in the certificate displayed by the SSH client. It is then possible to limit or release access by SSH clients which the mGuard would accept on the basis of certification checks:

– Limitation to certain *subjects* (i.e. individuals) or to *subjects* that have certain attributes

– Release for all subjects (see glossary under *"Subject, certificate" on page 8-5*)

The *X.509 subject* field must not be left empty.

Release for all subjects (individuals):

With an * (asterisk) in the *X.509 subject* field, you can define that all subject entries are allowed in the certificate displayed by the SSH client. It is then no longer necessary to identify or define the subject in the certificate.

Limitation to certain subjects (individuals) or to subjects that have certain attributes:

In the certificate, the certificate owner is entered in the *Subject* field. The entry is comprised of several attributes. These attributes are either expressed as an Object Identifier (e.g.: 132.3.7.32.1) or, more commonly, as an abbreviation with a relevant value.
Example: CN=John Smith, O=Smith and Co., C=UK

If certain subject attributes have very specific values for the acceptance of the SSH client by the mGuard, then these must be specified accordingly. The values of the other freely selectable attributes are entered using the ***** wildcard.
Example: CN=*, O=*, C=UK (with or without spaces between attributes)

In this example, the attribute "C=UK" must be entered in the certificate under "Subject". Only then does the mGuard accept the certificate owner (subject) as a communication partner. The other attributes in the certificates to be filtered can have freely selectable values.

If a subject filter is set, the number (but not the sequence) of the entered attributes must correspond to those of the certificates for which the filter is to be used.
Pay attention to capitalization.

Several filters can be set, and their sequence is irrelevant.

Management >> System Settings >> Shell Access (continued)

Authorized for access as:

All users / root / admin / netadmin / audit

Additional filter which defines that the SSH client has to have certain administration level authentication in order to gain access.

During connection, the SSH client shows its certificate and also the system user for which the SSH session is to be opened (*root, admin, netadmin, audit*). Access is only granted when the entries match those defined here.

Access for all listed system users is possible when *All users* is set.

The *netadmin* and *audit* settings relate to access rights with the Innominate Device Manager.

Client certificate

Configuration is required in the following cases:

– SSH clients each show a self-signed certificate.
– SSH clients each show a certificate signed by a CA. Filtering should take place: Access is only granted to a user whose certificate copy is installed in the mGuard as the remote certificate and is provided to the mGuard in this table as the *Client certificate*.
This filter is **not** subordinate to the *Subject* filter. It resides on the same level and is allocated a logical OR function with the *Subject* filter.

The entry in this field defines which remote certificate the mGuard should adopt in order to authenticate the remote peer (SSH client).

For this, select one of the remote certificates from the selection list. The selection list shows the remote certificates that were loaded in the mGuard under the *Authentication* >> *Certificates* menu.

Authorized for access as:

All users / root / admin / netadmin / audit

Filter which defines that the SSH client has to have certain administration level authentication in order to gain access.

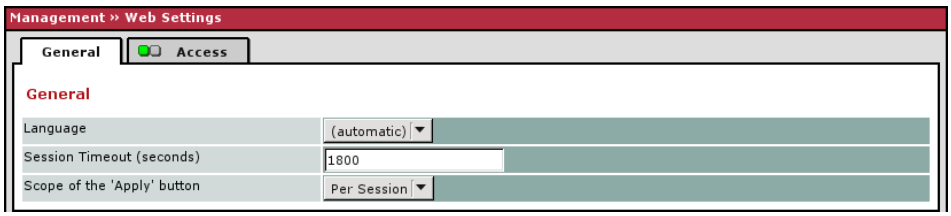
During connection, the SSH client shows its certificate and also the system user for which the SSH session is to be opened (*root, admin, netadmin, audit*). Access is only granted when the entries match those defined here.

Access for all listed system users is possible when *All users* is set.

The *netadmin* and *audit* settings relate to access rights with the Innominate Device Manager.

6.2.2 Management >> Web Settings

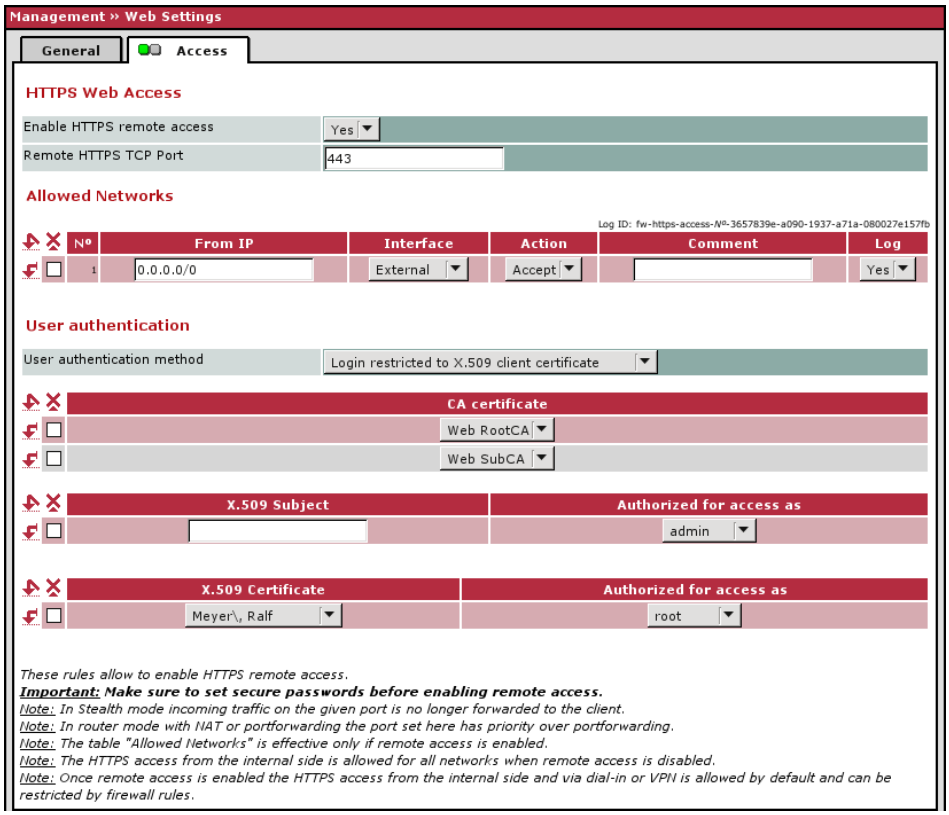
6.2.2.1 General



Management >> Web Settings >> General		
General	**Language**	If **(automatic)** is selected from the list of languages, the device uses the language setting of the system browser.
	Session Timeout (seconds)	Specifies the time interval of inactivity (in seconds) after which the user will be logged out automatically. Possible values: 15 to 86400 (= 24 hours)
	Scope of the "Apply" button	The **Per Page** setting specifies that you have to click the **Apply** button on every page where you make changes in order for the settings to be accepted and applied by the mGuard. The **Per Session** setting specifies that you only have to click **Apply** once after making changes on a number of pages.

6.2.2.2 Access

Only displayed with *Login with X.509 user certificate*


Management » Web Settings
General
Access
HTTPS Web Access
Enable HTTPS remote access
Yes
Remote HTTPS TCP Port
443
Allowed Networks
Log ID: fw-https-access-N°-3657839e-a090-1937-a71a-080027e157fb
N°
From IP
Interface
Action
Comment
Log
1
0.0.0.0/0
External
Accept
Yes
User authentication
User authentication method
Login restricted to X.509 client certificate
CA certificate
Web RootCA
Web SubCA
X.509 Subject
Authorized for access as
admin
X.509 Certificate
Authorized for access as
Meyer\, Ralf
root
These rules allow to enable HTTPS remote access.
Important: Make sure to set secure passwords before enabling remote access.
Note: In Stealth mode incoming traffic on the given port is no longer forwarded to the client.
Note: In router mode with NAT or portforwarding the port set here has priority over portforwarding.
Note: The table "Allowed Networks" is effective only if remote access is enabled.
Note: The HTTPS access from the internal side is allowed for all networks when remote access is disabled.
Note: Once remote access is enabled the HTTPS access from the internal side and via dial-in or VPN is allowed by default and can be restricted by firewall rules.

When web access by HTTPS protocol is enabled, the mGuard can be configured **from a remote system** using its web-based administrator interface. This means a browser running on the remote system is used to configure the mGuard.

This option is disabled by default.

ATTENTION: If you enable remote access, ensure secure root and administrator passwords are defined.

To enable HTTPS remote access, proceed as follows:

Management >> Web Settings >> Access		
HTTPS Web Access	**Enable HTTPS remote access: Yes / No**	To enable HTTPS remote access, set this option to **Yes**. *Internal* HTTPS remote access (i.e. from the directly connected LAN or from the directly connected computer) can be made independently of this switch setting. You must define the firewall rules for the available interfaces on this page under **Allowed Networks** in order to specify differentiated access possibilities to the mGuard. Additionally, the authentication rules under **User authentication** must be set, if necessary.

Management >> Web Settings >> Access (continued)

Remote HTTPS TCP Port

Default: 443

If this port number is changed, the new port number only applies for access over the *External, External 2, VPN* and *Dial-in* interface. Port number 443 still applies for internal access.

The remote peer that makes remote access must, if necessary, enter the port number defined here during entry of the address after the IP address.

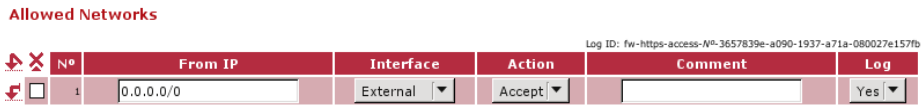
Example:

If this mGuard is accessible over the Internet under the address 123.124.125.21 and the port number 443 has been set for remote access, then you do not need to enter this port number after the address in the web browser on the remote peer.

If another port number is used, it is entered behind the IP address, e.g.: https://123.124.125.21:442/

The mGuard authenticates itself to the remote peer (in this case the browser of the user) using a self-signed machine certificate. This is a unique certificate issued by Innominate for each mGuard. This means that every mGuard is delivered with a unique, self-signed machine certificate.

Allowed Networks



Lists the firewall rules that have been set. These apply for incoming data packets of an HTTPS remote access attempt.

If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

The rules specified here only become effective if **Enable HTTPS remote access** is set to **Yes**. *Internal* access is also possible when this option is set to **No**. A firewall rule that would refuse *Internal* access is therefore not effective in this case.

You have the following options:

From IP

Enter the address of the system or network where remote access is permitted or forbidden in this field.

IP address: **0.0.0.0/0** means all addresses. To enter an address, use CIDR notation – see “CIDR (Classless Inter-Domain Routing)” on page 6-213.

Management >> Web Settings >> Access (continued)

Interface

External / Internal / External 2 / VPN / Dial-in[1]

Specifies which interface the rules apply to.

If no rules are set, or if no rule takes effect, the following default settings apply:

HTTPS access is permitted over *Internal, VPN* and *Dial-in*. Access over *External* and *External 2* is refused.

Specify the access possibilities according to your requirements.

If you want to refuse access over *Internal, VPN* or *Dial-in*, you must implement this explicitly through corresponding firewall rules, by specifying *Drop* as an action, for example. **To avoid locking yourself out**, you may have to simultaneously allow access over another interface explicitly with *Accept* before you make the new setting effective by clicking the **Apply** button. Otherwise, if you are locked out, you must perform the recovery procedure.

Action

- **Accept** means that data packets may pass through.
- **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. (In *Stealth* mode, *Reject* has the same effect as *Drop*.)
- **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.

Comment

Freely selectable comment for this rule.

Log

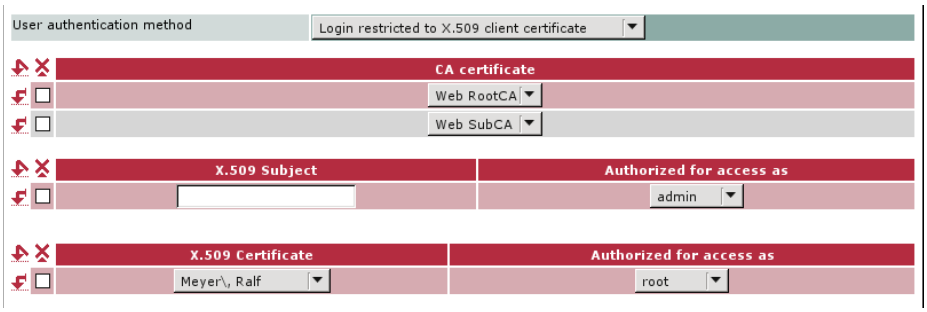
For each individual firewall rule, you can specify whether the use of the rule

- should be logged (set *Log* to **Yes**) or
- should not be logged (set *Log* to **No** – factory default)

1 *External 2* and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

Management >> Web Settings >> Access

User authentication



Defines how the local mGuard authenticates the remote peer

User authentication method

Login with password

Specifies that the remote mGuard user must use a password for authentication. The password is specified under the *Authentication >> Local Users* menu (see page 6-108).

Depending on which user ID is used (user or administrator password), the user has the right to operate and configure the mGuard.

Login with X.509 client certificate or password

– Option 1: User authentication is made with a password (see above).
– Option 2: The user's browser authenticates itself using an X.509 certificate and a corresponding private key. Further details must be specified here.

The use of either method depends on the web browser of the remote user. The second option is used when the web browser provides the mGuard with a certificate.

Login restricted to X.509 client certificate

The user's browser must use an X.509 certificate and the corresponding private key to authenticate itself. Further details must be specified here.

Before selecting the *Login restricted to X.509 client certificate* option, you must first select and test the *Login with X.509 client certificate or password* option.

Only switch to *Login restricted to X.509 client certificate* when you are sure that this setting works. **Otherwise you could be locked out of the system!**

Always take this precautionary measure when settings are changed under **User authentication**.

If the following User authentication methods are defined, then you must subsequently define how mGuard authenticates the remote user according to X.509:

– Login restricted to X.509 client certificate
– Login with X.509 client certificate or password

The table below shows which certificates must be provided for the mGuard to authenticate the user (access over HTTPS) when the user or their browser provides one of the following certificate types on connection:

– A certificate signed by a CA
– A self-signed certificate

For further information on the following table, see “Authentication >> Certificates” on page 6-113.

X.509 authentication for HTTPS

The remote peer shows the following:	Certificate (specific to individual) **signed by CA**[1]	Certificate (specific to individual) **self-signed**
The mGuard authenticates the remote peer using:		
	All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer or ADDITIONALLY Remote certificates, **if** used as a filter	Remote certificate

[1] The remote peer can additionally provide sub-CA certificates. In this case the mGuard can form the set union for building the chain from the CA certificates provided and the self-configured CA certificates. The corresponding root certificate must always be available on the mGuard.

According to this table, the certificates must then be provided that the mGuard uses to authenticate a remote user (access over HTTPS) or their browser.

The following instructions assume that the certificates have already been correctly installed in the mGuard (see “Authentication >> Certificates” on page 6-113).

If the use of block lists (CRL checking) is activated under the Authentication >> Certificates*, Certificate settings* menu, then each certificate signed by a CA that an HTTPS client presents is checked for blocks.

Management >> Web Settings >> Access

CA certificate

The configuration is only necessary when a user with HTTPS access displays a certificate signed by a CA.

All CA certificates needed by the mGuard to build the chain to the respective root CA certificate together with the certificates displayed by the users must be configured.

If the browser of the remote user also provides CA certificates that contribute to building of the chain, then it is not necessary for the CA certificate to be installed and referenced at this point.

However, the corresponding root CA certificate must be installed in the mGuard and made available (referenced) at all times.

When selecting the CA certificates to be used, or when changing the selection or the filter settings, you must first select *Login with X.509 client certificate or password* as the *User authentication method* and test this before making the (new) setting effective.

Only switch to *Login restricted to X.509 client certificate* when you are sure that this setting works. **Otherwise you could be locked out of the system!**

Always take this precautionary measure when settings are changed under **User authentication**.

Management >> Web Settings >> Access (continued)

X.509 Subject

Allows a filter to be set in relation to the contents of the *Subject* field in the certificate displayed by the browser/HTTPS client.

It is then possible to limit or release access by browser/HTTPS clients which the mGuard would accept on the basis of certification checks:

– Limitation to certain *subjects* (i.e. individuals) or to *subjects* that have certain attributes
– Release for all subjects (see glossary under “Subject, certificate” on page 8-5*)*

The *X.509 Subject* field must not be left empty.

Release for all subjects (individuals):

With an * (asterisk) in the *X.509 Subject* field, you can define that all subject entries are allowed in the certificate provided by the browser/HTTPS client. It is then no longer necessary to identify or define the subject in the certificate.

Management >> Web Settings >> Access (continued)

Limitation to certain subjects (individuals) or to subjects that have certain attributes:

In the certificate, the certificate owner is entered in the *Subject* field. The entry is comprised of several attributes. These attributes are either expressed as an Object Identifier (e.g.: 132.3.7.32.1) or, more commonly, as an abbreviation with a relevant value.
Example: CN=John Smith, O=Smith and Co., C=UK

If certain subject attributes have very specific values for the acceptance of the browser by the mGuard, then these must be specified accordingly. The values of the other freely selectable attributes are entered using the ***** wildcard.
Example: CN=*, O=*, C=UK (with or without spaces between attributes)

In this example, the attribute “C=UK” must be entered in the certificate under “Subject”. Only then does the mGuard accept the certificate owner (subject) as a communication partner. The other attributes in the certificates to be filtered can have freely selectable values.

If a subject filter is set, the number (but not the sequence) of the entered attributes must correspond to those of the certificates for which the filter is to be used.
Pay attention to capitalization.

With HTTPS, the browser of the accessing user does not specify with which user or administration authorization it logs in. These access rights are allocated by setting filters here (under “Authorized for access”).

This has the following result: If there are several filters that “let through” a certain user, then the first filter comes into effect. The user receives the access rights as defined by this filter. This could deviate from the access rights allocated to the user in the subsequent filters.

If remote certificates are configured as filters in the **X.509 Certificate** table column, then these filters have priority over filter settings here.

Authorized for access as:

All users / root / admin / netadmin / audit

Defines which user or administrator rights are granted to the remote user.

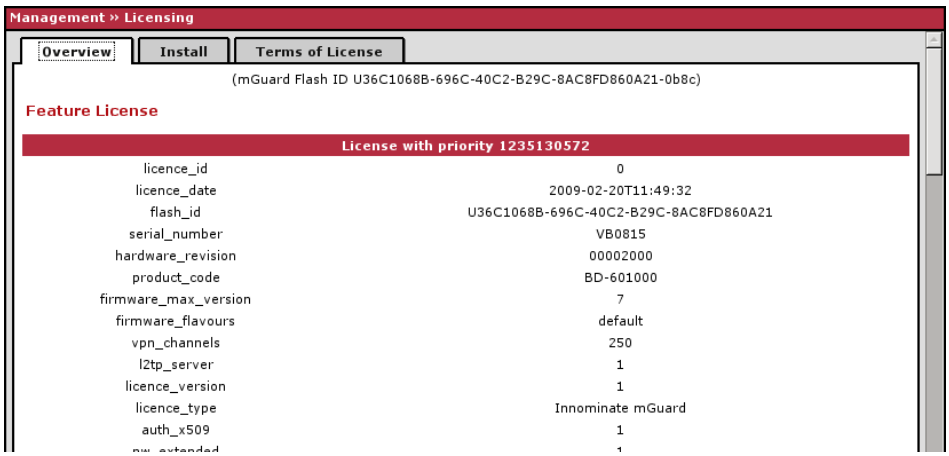
For a description of the *root, admin* and *user* authorization levels, see “Authentication >> Local Users” on page 6-108.

The *netadmin* and *audit* authorization levels relate to access rights with the Innominate Device Manager.

Management >> Web Settings >> Access (continued)		
	X.509 Certificate	Configuration is required in the following cases: – Remote users each show a self-signed certificate. – Remote users each show a certificate signed by a CA. Filtering should take place: Access is only granted to a user whose certificate copy is installed in the mGuard as the remote certificate and is provided to the mGuard in this table as the *X.509 Certificate*. If used, this filter has priority over the *Subject* filter in the table above. The entry in this field defines which remote certificate the mGuard should use in order to authenticate the remote peer (browser of the remote user). For this, select one of the remote certificates from the selection list. The selection list shows the remote certificates that were loaded in the mGuard under the Authentication >> Certificates menu.
	Authorized for access as:	**root / admin / netadmin / audit / user** Defines which user or administrator rights are granted to the remote user. For a description of the *root, admin* and *user* authorization levels, see “Authentication >> Local Users” on page 6-108**.** The *netadmin* and *audit* authorization levels relate to access rights with the Innominate Device Manager.

6.2.3 Management >> Licensing

6.2.3.1 Overview



From mGuard version 5.0 onwards, licenses also remain installed after firmware is flashed.

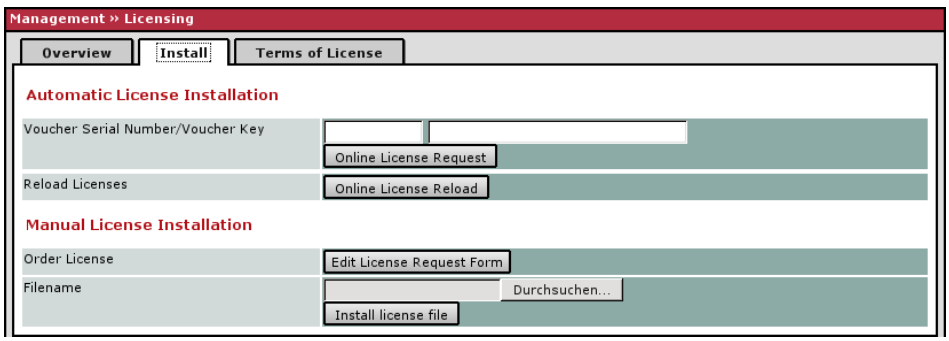
Licenses are still deleted when devices with older firmware versions are flashed to version 5.0.0 or higher. Before flashing, the license for using the new update must first be obtained so that the required license file is available for the flash.

This applies to major release upgrades, for example from version 4.x.y to version 5.x.y to version 6.x.y etc. (see “Flashing the firmware / rescue procedure” on page 7-3).

Management >> Licensing >> Overview		
General	**Feature License**	Displays which functions are included with the installed mGuard license, e.g. the number of possible VPN tunnels, whether remote logging is supported, etc.

6.2.3.2 Install

You can subsequently add more functions to the mGuard license you have obtained.



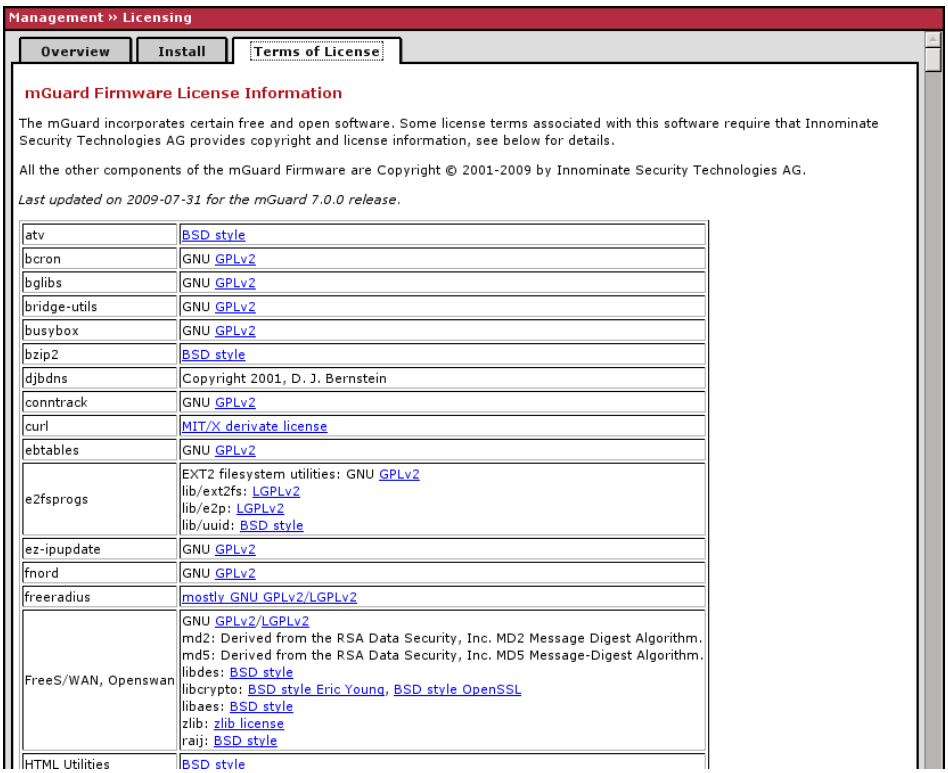
You will find a voucher serial number and a voucher key in the voucher included with the mGuard. The voucher can also be purchased separately.

With this you can perform the following functions:

– Request the required feature license file
– Install the license file

Management >> Licensing >> Install		
Automatic License Installation	**Voucher Serial Number / Voucher Key**	Enter the serial number printed on the voucher and the corresponding voucher key, then click on **Online License Request**. The mGuard now establishes a connection via the Internet and installs the respective license on the mGuard if the voucher is valid.
	Reload Licenses	This can be used if the license installed in the mGuard has been deleted. Click on the **Online License Reload** button. The licenses that were previously issued for this mGuard are then retrieved from the Internet and installed.
Manual License Installation	**Order License** **Filename**	After clicking the **Edit License Request Form** button, an online form is provided which can be used to order the desired license. In the request form, enter the following information: – **Voucher Serial Number:** The serial number printed on the voucher – **Voucher Key:** The voucher key on the voucher – **Flash ID:** Filled out automatically After the form is sent, the license file is made available for downloading and can be installed in the mGuard in a subsequent step. **Filename (installing the license)** To install a license, first save the license file as a separate file on your computer, then proceed as follows: • Click on the **Browse...** button next to the *Filename* field. Select the file and open it so that the file name or path is displayed in the *Filename* field. • Click on the **Install license file** button.

6.2.3.3 Terms of License



Lists the licenses of the external software used in the mGuard. This software is usually open-source software.

6.2.4 Management >> Update

From mGuard version 5.0.0 onwards, a license must be purchased for the device before the installation of a major release update (e.g. from version 4.x.y to 5.x.y or from version 5.x.y to 6.x.y).

The license must be installed on the device before a firmware update is made (see “Management >> Licensing” on page 6-28 and “Install” on page 6-28).

Minor release upgrades (i.e. same main version, e.g. within version 5.x.y) can be installed without a license until further notice.

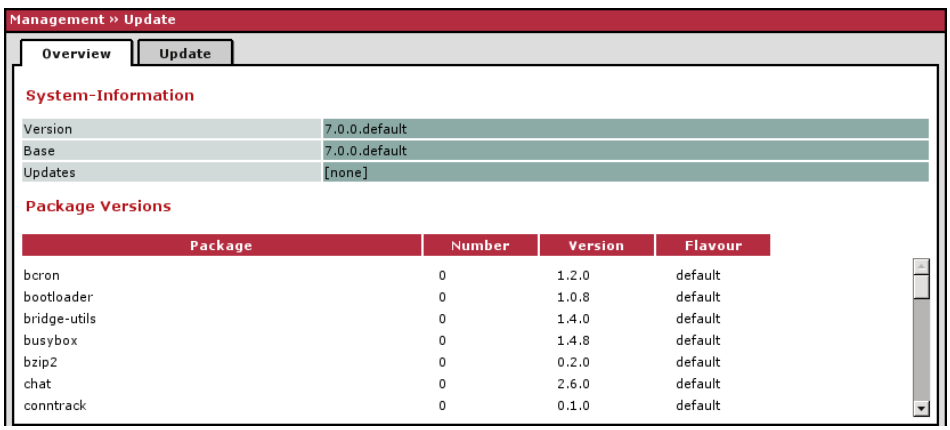
From firmware version 5.0 onwards, licenses also remain installed after firmware is flashed.

The “Firewall Redundancy” function is not available in firmware version 7.0.

Devices with an installed license for firewall redundancy reject firmware updates to version 7.0 when the “Firewall Redundancy” function is activated.

The “Ring/Network Coupling” function is not available in firmware version 7.0.

6.2.4.1 Overview

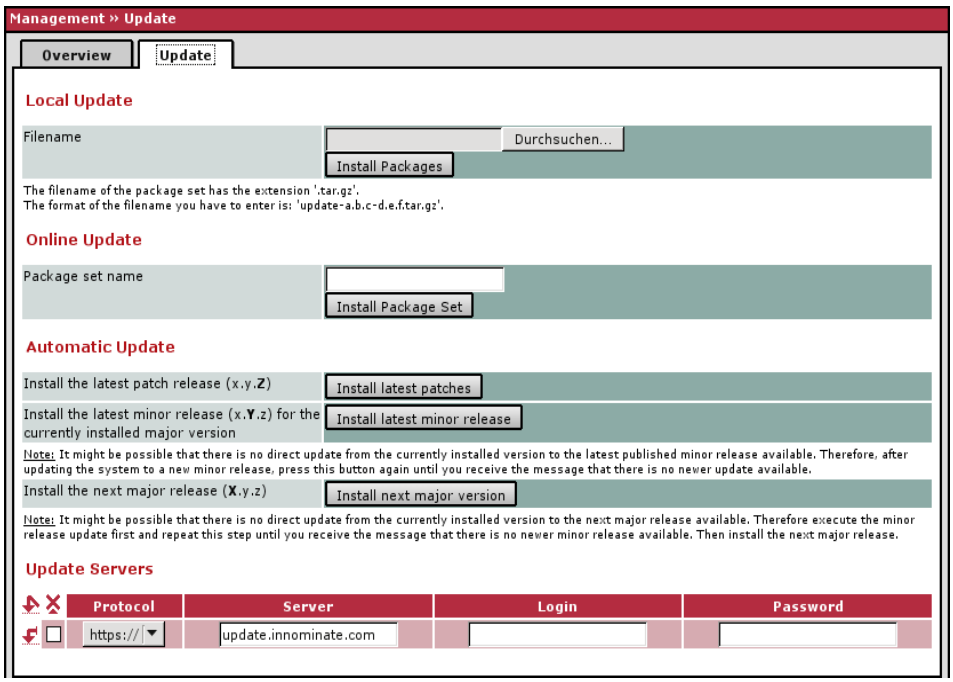


Management >> Update >> Overview		
System Information	**Version**	The current software version of the mGuard.
	Base	The software version that was originally used to flash this mGuard.
	Updates	List of updates that have been installed on the base.
Package Versions	Lists the individual software modules of the mGuard. Can be used for support purposes.	

6.2.4.2 Update

There are two possibilities for carrying out a firmware update:

1. You have the current package set file on your computer (the file name ends with ".tar.gz") and you perform a local update.
2. You download the package set file via the Internet from the update server and then install the packages.


Management » Update
Overview
Update
Local Update
Filename
Durchsuchen...
Install Packages
The filename of the package set has the extension '.tar.gz'.
The format of the filename you have to enter is: 'update-a.b.c-d.e.f.tar.gz'.
Online Update
Package set name
Install Package Set
Automatic Update
Install the latest patch release (x.y.Z)
Install latest patches
Install the latest minor release (x.Y.z) for the currently installed major version
Install latest minor release
Note: It might be possible that there is no direct update from the currently installed version to the latest published minor release available. Therefore, after updating the system to a new minor release, press this button again until you receive the message that there is no newer update available.
Install the next major release (X.y.z)
Install next major version
Note: It might be possible that there is no direct update from the currently installed version to the next major release available. Therefore execute the minor release update first and repeat this step until you receive the message that there is no newer minor release available. Then install the next major release.
Update Servers
Protocol
Server
Login
Password
https://
update.innominate.com

ATTENTION: Do not disconnect the power supply to the mGuard during the update procedure! The device could be damaged and may have to be reactivated by the manufacturer.

Depending on the size of the update, this may take several minutes.

A message is displayed if a reboot is necessary after the update is completed.

From mGuard version 5.0.0 onwards, a license must be purchased for the device before the installation of a major release update (e.g. from version 4.x.y to 5.x.y or from version 5.x.y to 6.x.y).

The license must be installed on the device before a firmware update is made (see "Management >> Licensing" on page 6-28, "Install" on page 6-28).

Minor release upgrades (i.e. same main version, e.g. within version 5.x.y) can be installed without a license until further notice.

The "Firewall Redundancy" function is not available in firmware version 7.0.

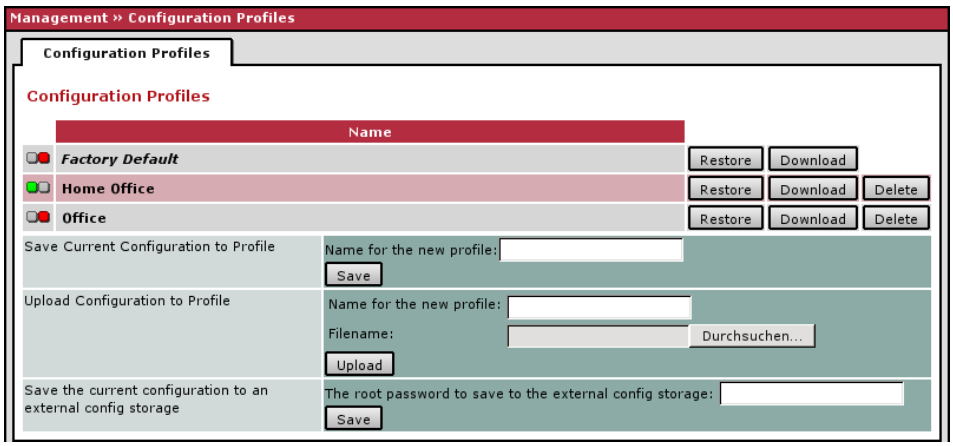
Devices with an installed license for firewall redundancy reject firmware updates to version 7.0 when the "Firewall Redundancy" function is activated.

The “Ring/Network Coupling” function is not available in firmware version 7.0.

Management >> Update		
Local Update	**Filename**	To install the packages proceed as follows: • Click on the **Browse...** button. Select the file and open it so that the file name or path is displayed in the *Filename* field. The file name should have the following format: update-a.b.c-d.e.f.default.tar.gz • Click on the **Install Packages** button.
Online Update		To perform an online update, please proceed as follows: • Ensure that there is at least one valid entry under **Update Servers**. You should have received the necessary details from your licensing authority. • Enter the name of the package set, e.g. “update-4.0.x-4.1.0”. • Click on the **Install Package Set** button.
Automatic Update	This is a variation of the online update where the mGuard independently determines the required package set.	
	Install the latest patch release (x.y.Z)	Patch releases resolve errors in previous versions and have a version number which only changes in the third digit position. For example, 4.0.1 is a patch release for version 4.0.0.
	Install the latest minor release (x.Y.z) for the currently installed major version	Minor and major releases supplement the mGuard with new features or contain modifications to the behavior of the mGuard. Their version number changes in the first and second digit position.
	Install the next major release (X.y.z)	For example, 4.1.0. is a major or minor release for versions 3.1.0 or 4.0.1 respectively.
Update Servers	Define from which servers the mGuard may be updated here..	
	The list of servers is processed top-down until an available server is found. The sequence of the entries thus defines their priorities.	
	All configured update servers must provide the same updates.	
	You have the following options:	
	Protocol	The update can be made using either HTTP or HTTPS.
	Server	Hostname of the server that provides the update files.
	Login	Login for the server.
	Password	Password for the login.

6.2.5 Management >> Configuration Profiles

6.2.5.1 Configuration Profiles



You can save the configuration settings of the mGuard as a configuration profile under any name in the mGuard. It is possible to create and save multiple configuration profiles. You may then switch between different profiles, for example, if the mGuard is used in different operating environments.

Furthermore, you can also save configuration profiles as files on your configuration computer. Alternately, these configuration files can then be read back onto the mGuard and activated.

You can restore the mGuard to the *factory default* at any time.

Configuration profiles on the EAGLE mGuard and mGuard centerport can also be stored on an automatic configuration adapter (ACA) or USB memory stick that can be connected to the V.24/USB port of the mGuard (see “Profiles on external storage medium: EAGLE mGuard, mGuard centerport” on page 6-36).

When a configuration profile is saved, the passwords used for the authentication of administrative access to the mGuard are not saved.

It is possible to load and activate a configuration profile that was created under an older firmware version of the mGuard. The reverse is not the case – a configuration profile created under a newer firmware version should not be loaded.

Management >> Update >> Configuration Profiles	
Configuration Profiles	The top of the *Configuration Profiles* page has a list of configuration profiles that are stored on the mGuard, for example, the *Factory Default* configuration profile. If any configuration profiles have been saved by the user (see below), they will be listed here. **Active configuration profile:** The configuration profile currently in effect has an *Active* symbol at the front of the entry. You can perform the following with configuration profiles that are stored on the mGuard: – Activate them – Save them to a file on the connected configuration computer – Delete them – Display them

Management >> Update >> Configuration Profiles (continued)

Displaying the configuration profile

- Click the name of the configuration profile in the list.

Applying the factory defaults or a configuration profile stored in the mGuard by the user

- Click the **Restore** button located to the right of the name of the relevant configuration profile.
  The corresponding configuration profile is activated.

Saving the configuration profile as a file to the configuration computer

- Click the **Download** button located to the right of the relevant configuration profile.
- Specify the file name and folder in which the configuration profile is to be saved as a file in the displayed text field.
  (The file name is freely selectable.)

Deleting a configuration profile

- Click the **Delete** button located to the right of the relevant configuration profile.

The *Factory Default* profile cannot be deleted.

Saving the current configuration as a configuration profile on the mGuard

- Enter the desired profile name in the *Name for the new profile* field next to “Save Current Configuration to Profile”.
- Click on the **Save** button.
  The configuration profile is saved in the mGuard, and the profile name is displayed in the list of profiles saved in the mGuard.

Uploading a configuration profile that has been saved to the configuration computer file

Requirement: You have saved a configuration profile on the configuration computer as a file according to the procedure described above.

- Enter the desired profile name in the *Name for the new profile* field next to “Upload Configuration to Profile”.
- Click on the **Browse...** button. Select the file and open it so that the file name or path is displayed in the dialog.
- Click on the **Upload** button.
  The configuration profile is loaded on the mGuard. The name assigned in step 1 is displayed in the list of profiles stored on the mGuard.

Profiles on external storage medium: EAGLE mGuard, mGuard centerport

EAGLE mGuard: Configuration profiles can also be stored on an automatic configuration adapter (ACA).

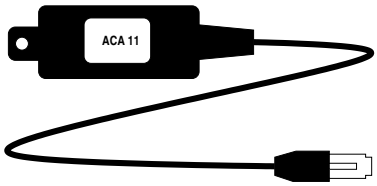


Fig. 6-1 External automatic configuration adapter (ACA)

mGuard centerport (also **EAGLE mGuard** with **USB interface**): Configuration profiles can also be stored on a USB memory stick. This must have the following properties:

– vfat file system on the initial primary partition with at least 64 MB memory.

Saving profiles on an external storage medium

- Connect the ACA to the V.24 (ACA11) or USB (ACA21) port (EAGLE mGuard only)
  OR
  Connect the USB stick to the USB port (mGuard centerport, also EAGLE mGuard with USB interface)
- If the password of the mGuard where the profile is imported has a different root password than “root”, then you must enter this password under **The root password to save to the external config storage**.
- Click on the **Save** button.
  EAGLE mGuard: The LED STATUS (and the V.24 LED for ACA11) flashes until the save procedure is finished.

Loading a profile from an external storage medium

- Connect the ACA to the V.24 (ACA11) or USB (ACA21) port (EAGLE mGuard only)
  OR
  Connect the USB stick to the USB port (mGuard centerport, also EAGLE mGuard with USB interface)
- Start the mGuard whilst the storage medium is plugged in.
- The root password of the mGuard must either be “root” or must correspond to the password entered when saving the profile.
  EAGLE mGuard: The LED STATUS (and the V.24 LED for ACA11) flashes until the load procedure is finished.

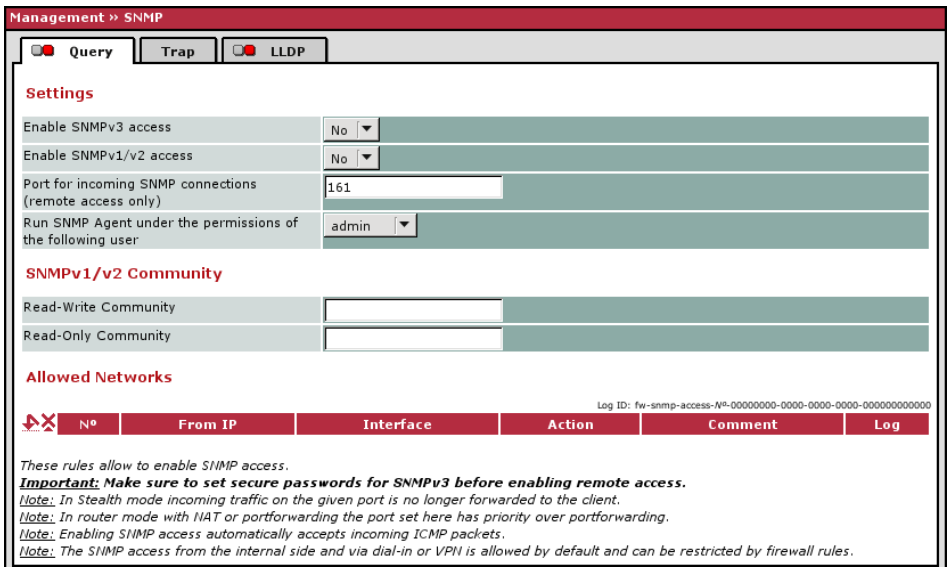
The configuration profile loaded from the storage medium is loaded into the mGuard and activated.

The loaded configuration profile does not appear in the list of configuration profiles stored on the mGuard.

The configuration on the external storage medium also contains the passwords for the users *root*, *admin*, *netadmin*, *audit* and *user*. These are also set when loading from the external storage medium.

6.2.6 Management >> SNMP

6.2.6.1 Query


Management » SNMP
Query
Trap
LLDP
Settings
Enable SNMPv3 access
No
Enable SNMPv1/v2 access
No
Port for incoming SNMP connections (remote access only)
161
Run SNMP Agent under the permissions of the following user
admin
SNMPv1/v2 Community
Read-Write Community
Read-Only Community
Allowed Networks
Log ID: fw-snmp-access-Nº-00000000-0000-0000-0000-000000000000
Nº
From IP
Interface
Action
Comment
Log
These rules allow to enable SNMP access.
Important: Make sure to set secure passwords for SNMPv3 before enabling remote access.
Note: In Stealth mode incoming traffic on the given port is no longer forwarded to the client.
Note: In router mode with NAT or portforwarding the port set here has priority over portforwarding.
Note: Enabling SNMP access automatically accepts incoming ICMP packets.
Note: The SNMP access from the internal side and via dial-in or VPN is allowed by default and can be restricted by firewall rules.

The SNMP (Simple Network Management Protocol) is mainly used in more complex networks to monitor the status and operation of devices.

SNMP is available in several releases: SNMPv1/SNMPv2 and SNMPv3.

The older versions (SNMPv1/SNMPv2) do not use encryption and are not considered to be secure. We therefore do not recommend using SNMPv1/ SNMPv2.

SNMPv3 is considerably better from a security perspective, but not all management consoles support it.

If SNMPv3 or SNMPv1/v2 is enabled, this is indicated by a green signal field on the tab at the top of the page. Otherwise – i.e. if neither v3 nor v1/2 is enabled – the signal field is red.

Processing an SNMP query can take longer than one second. However, the default timeout value of many SNMP management applications is set to one second.

- If you experience timeout problems, set the timeout of your management application to values between 3 and 5 seconds.

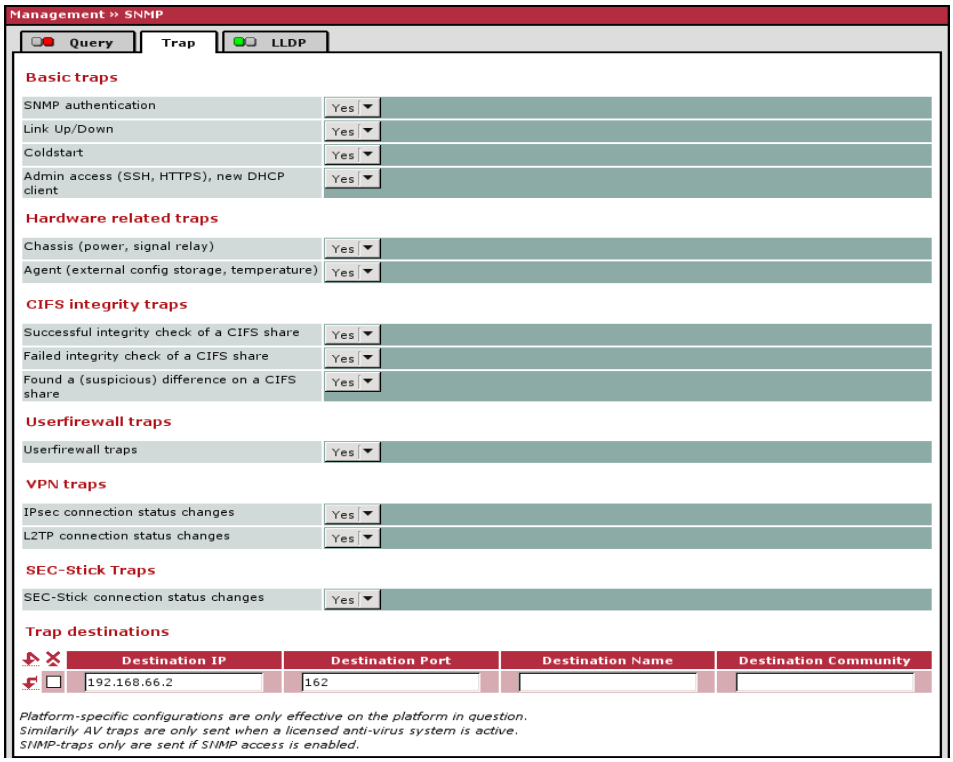
Management >> SNMP >> Query		
Settings	**Enable SNMPv3 access: Yes / No**	If you wish to allow monitoring of the mGuard via SNMPv3, set this option to **Yes**. You must define the firewall rules for the available interfaces on this page under **Allowed Networks** in order to specify access and monitoring options for the mGuard. Access via SNMPv3 requires authentication with a login and password. The factory defaults for the login parameters are: **Login:** admin **Password:** SnmpAdmin (please pay attention to capitalization!) MD5 is supported for the authentication process; DES is supported for encryption. The login parameters for SNMPv3 can only be changed using SNMPv3.
	Enable SNMPv1/v2 access: Yes / No	If you wish to allow monitoring of the mGuard via SNMPv1/v2, set this option to **Yes**. You must also enter your login data under **SNMPv1/v2 Community**. You must define the firewall rules for the available interfaces on this page under **Allowed Networks** in order to specify access and monitoring options for the mGuard.
	Port for SNMP connections	Default: 161 If this port number is changed, the new port number only applies for access over the *External, External 2, VPN* and *Dial-in* interface. Port number 161 still applies for internal access. The remote peer making the remote access may have to enter the port number defined here when entering the address.
SNMPv1/v2 Community	**Read-Write Community**	Enter the required login data in these fields.
	Read-Only Community	Enter the required login data in these fields.
Allowed Networks	Lists the firewall rules that have been set. These apply for incoming data packets of an SNMP access. The rules specified here only become effective if **Enable SNMPv3 access** or **Enable SNMPv1/v2 access** is set to **Yes**. If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.	

Management >> SNMP >> Query (continued)

From IP	Enter the address of the system or network where remote access is permitted or forbidden in this field. You have the following options: – An IP address – To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213). – **0.0.0.0/0** means all addresses.
Interface	**External / Internal / External 2 / VPN / Dial-in**[1] Specifies which interface the rules apply to. If no rules are set, or if no rule takes effect, the following default settings apply: SNMP monitoring is permitted over *Internal, VPN* and *Dial-in*. Access over *External* and *External 2* is refused. If required, you can specify the monitoring possibilities. **ATTENTION:** If you want to refuse access over *Internal, VPN* or *Dial-in*, you must implement this explicitly through corresponding firewall rules, by specifying *Drop* as an action, for example. **To avoid locking yourself out**, you may have to simultaneously allow access over another interface explicitly with *Accept* before you make the new setting effective by clicking the **Apply** button. Otherwise, if you are locked out, you must perform the recovery procedure.
Action	**Accept** means that data packets may pass through. **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. In *Stealth* mode, *Reject* has the same effect as *Drop*. **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.
Comment	Freely selectable comment for this rule.
Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)

1 *External 2* and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

6.2.6.2 Trap



In certain cases, the mGuard can send SNMP traps.

Traps correspond to SNMPv1. The following list details the trap information for each setting. The exact description can be found in the MIB belonging to the mGuard.

If SNMP traps are sent to the remote peer via a VPN channel, the IP address of the remote peer must be located in the network that is entered as the **Remote** network in the definition of the VPN connection.

The internal IP address (in Stealth mode, the **Stealth Management IP Address** or the **Virtual IP**) must be located in the network that is entered as **Local** in the definition of the VPN connection (see “Defining VPN connection / VPN connection channels” on page 6-167).

– If the **Enable 1-to-1 NAT of the local network to an internal network** option is set to **Yes**, (see “1:1 NAT” on page 6-174), the following applies:

  The internal IP address (in Stealth mode, the **Stealth Management IP Address** or the **Virtual IP**) must be located in the network that is entered as **Internal network address for local 1-to-1 NAT**.

– If the **Enable 1-to-1 NAT of the remote network to another network** option is set to **Yes**, (see “1:1 NAT” on page 6-174), the following applies:

  The IP address of the trap recipient must be located in the network that is entered as **Remote** VPN.

Management >> SNMP >> Trap		
Basic traps	**SNMP authentication**	Activate traps **Yes / No** – enterprise-oid : mGuardInfo – generic-trap : authenticationFailure – specific-trap : 0 Sent if an unauthorized station tries to access the mGuard SNMP agent.
	Link Up / Down	Activate traps **Yes / No** – enterprise-oid : mGuardInfo – generic-trap : linkUp, linkDown – specific-trap : 0 Sent when the connection to a port is interrupted (linkDown) or restored (linkUp).
	Coldstart	Activate traps **Yes / No** – enterprise-oid : mGuardInfo – generic-trap : coldStart – specific-trap : 0 Sent after cold or warm start.
	Admin access (SSH, HTTPS), new DHCP client	Activate traps **Yes / No** – enterprise-oid : mGuard – generic-trap : enterpriseSpecific – specific-trap : mGuardHTTPSLoginTrap (1) – additional : mGuardHTTPSLastAccessIP Sent when someone has tried unsuccessfully to open a HTTPS session (e.g. using an incorrect password). The trap contains the IP address of the last unsuccessful login request attempt. – enterprise-oid : mGuard – generic-trap : enterpriseSpecific – specific-trap : mGuardShellLoginTrap (2) – additional : mGuardShellLastAccessIP Sent when someone opens the shell using SSH or the serial port. The trap contains the IP address of the login request. If this request is made over the serial port, then the value is 0.0.0.0. – enterprise-oid : mGuard – generic-trap : enterpriseSpecific – specific-trap : 3 – additional : mGuardHTTPSLastAccessMAC Sent when a DHCP request from an unknown client is received.

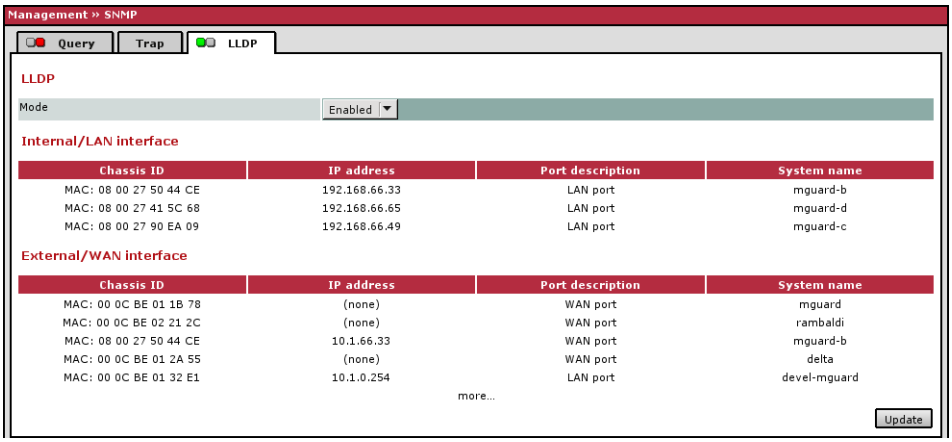
Management >> SNMP >> Trap (continued)		
Hardware related traps (mGuard industrial RS and EAGLE mGuard only)	**Chassis (power, signal relay)**	Activate traps **Yes / No** – enterprise-oid : mGuardTrapSenderIndustrial – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapIndustrialPowerStatus (2) – additional : mGuardTrapIndustrialPowerStatus Sent when the system registers a power outage. – enterprise-oid : mGuardTrapSenderIndustrial – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapSignalRelais (3) – additional : mGuardTResSignalRelaisState (mGuardTEsSignlalRelaisReason, mGuardTResSignal RelaisReasonIdx) Sent after the signal contact is changed, and displays the current status (0 = Off, 1 = On).
	Agent (external config storage, temperature)	Activate traps **Yes / No** – enterprise-oid : mGuardTrapIndustrial – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapIndustrialTemperature (1) – additional : mGuardSystemTemperature, mGuardTrapIndustrialTempHiLimit, mGuardTrapIndustrialLowLimit Displays the temperature when defined limits are exceeded. – enterprise-oid : mGuardTrapIndustrial – genericTrap : enterpriseSpecific – specific-trap : mGuardTrapAutoConfigAdapterState (4) – additional : mGuardTrapAutoConfigAdapter Change Sent following access to the ACA.
mGuard blade controller traps (blade only)	**Blade status change**	(blade switch, outage): Activate traps **Yes / No** – enterprise-oid : mGuardTrapBladeCTRL – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapBladeCtrlPowerStatus (2) – additional : mGuardTrapBladeRackID, mGuardTrapBladeSlotNr, mGuardTrapBladeCtrlPowerStatus Sent when the power supply status of the blade pack changes.

Management >> SNMP >> Trap (continued)		
		– enterprise-oid : mGuardTrapBladeCTRL – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapBladeCtrlRunStatus (3) – additional : mGuardTrapBladeRackID, mGuardTrapBladeSlotNr, mGuardTrapBladeCtrlRunStatus Sent when the blade run status changes.
	Blade reconfiguration	(backup / restore): Activate traps **Yes / No** – enterprise-oid : mGuardTrapBladeCtrlCfg – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapBladeCtrlCfgBackup (1) – additional : mGuardTrapBladeRackID, mGuardTrapBladeSlotNr, mGuardTrapBladeCtrlCfgBackup Sent when configuration backup for mGuard blade controller is triggered. – enterprise-oid : mGuardTrapBladeCtrlCfg – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapBladeCtrlCfgRestored 2 – additional : mGuardTrapBladeRackID, mGuardTrapBladeSlotNr, mGuardTrapBladeCtrlCfgRestored Sent when configuration restoration for mGuard blade controller is triggered.
CIFS integrity traps	**Successful integrity check of a CIFS share**	Activate traps **Yes / No** – enterprise-oid : mGuardTrapCIC – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapCICDone (1) – additional : mGuardTrapCICShareName, mGuardTrapCICShareUNC Sent when the CIFS integrity check has been successfully completed.
	Failed integrity check of a CIFS share	Activate traps **Yes / No** – enterprise-oid : mGuardTrapCIC – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapCICFail (2) – additional : mGuardTrapCICShareName, mGuardTrapCICShareUNC Sent when the CIFS integrity check has failed.

Management >> SNMP >> Trap (continued)		
	Found a (suspicious) difference on a CIFS share	Activate traps **Yes / No** – enterprise-oid : mGuardTrapCIC – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapCICFail (2) – additional : mGuardTrapCICShareName, mGuardTrapCICShareUNC Sent when the CIFS integrity check has detected a difference.
Userfirewall traps	**Userfirewall traps**	Activate traps **Yes / No** – enterprise-oid : mGuardTrapUserFirewall – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapUserFirewallLogin (1) – additional : mGuardTResUserFirewallUsername, mGuardTResUserFirewallSrcIP, mGuardTResUserFirewallAuthenticationMethod Sent when user logs in to a user firewall. – enterprise-oid : mGuardTrapUserFirewall – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapUserFirewallLogout (2) – additional : mGuardTResUserFirewallUsername, mGuardTResUserFirewallSrcIP, mGuardTResUserFirewallLogoutReason Sent when user logs out of a user firewall. – enterprise-oid : mGuardTrapUserFirewall – generic-trap : enterpriseSpecific – specific-trap : mGuardTrapUserFirewallAuthError TRAP-TYPE (3) – additional : mGuardTResUserFirewallUsername, mGuardTResUserFirewallSrcIP, mGuardTResUserFirewallAuthenticationMethod Sent during an authentication error.
VPN traps	**IPsec connection status changes**	Activate traps **Yes / No** – enterprise-oid : mGuardTrapVPN – genericTrap : enterpriseSpecific – specific-trap : mGuardTrapVPNIKEServerStatus (1) – additional : mGuardTResVPNStatus Sent during starting and stopping of IPsec IKE server

Management >> SNMP >> Trap (continued)		
		– enterprise-oid : mGuardTrapVPN – genericTrap : enterpriseSpecific – specific-trap : mGuardTrapVPNIPsecConnStatus (2) – additional : mGuardTResVPNName, mGuardTResVPNIndex, mGuardTResVPNPeer, mGuardTResVPNStatus, mGuardTResVPNType, mGuardTResVPNLocal, mGuardTResVPNRemote Sent when the state of an IPsec connection changes
	L2TP connection status changes	Activate traps **Yes / No** – enterprise-oid : mGuardTrapVPN – genericTrap : enterpriseSpecific – specific-trap : mGuardTrapVPNL2TPConnStatus (3) – additional : mGuardTResVPNName, mGuardTResVPNIndex, mGuardTResVPNPeer, mGuardTResVPNStatus, mGuardTResVPNLocal, mGuardTResVPNRemote Sent when the state of an L2TP connection changes
Trap destinations	**Traps can be sent to one or more destinations.**	
	Destination IP	IP address to which the trap should be sent.
	Destination Port	Default: 162 Destination port to which the trap should be sent.
	Destination Name	Optional name for the destination. Has no influence on the generated traps.
	Destination Community	Name of the SNMP community to which the trap is allocated.

6.2.6.3 LLDP

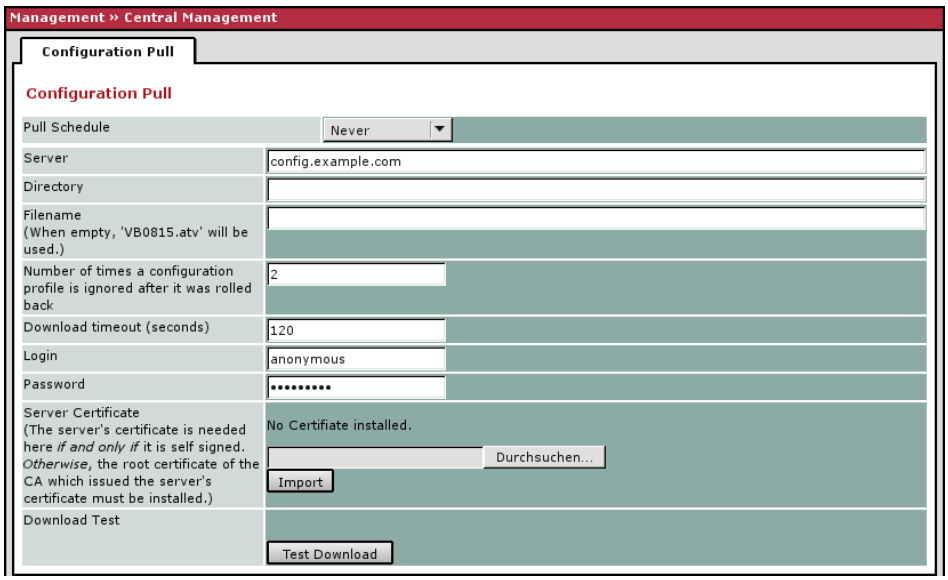


LLDP (Link Layer Discovery Protocol, IEEE 802.1AB/D13) uses suitable request methods to automatically determine the (Ethernet) network infrastructure. LLDP-capable devices periodically send Ethernet multicasts (layer 2). Tables of systems connected to the network are created from the responses, and these can be requested using SNMP.

Management >> SNMP >> LLDP		
LLDP	**Mode**	**Enabled / Disabled** The LLDP service or agent can be globally enabled or disabled here. If the function is enabled, this is indicated by a green signal field on the tab at the top of the page. If the signal field is red, the function is disabled.
Internal / LAN interface **External / WAN interface**	**Chassis ID**	A unique ID of the system found; typically one of its MAC addresses.
	IP address	The IP address of the system found, with which SNMP administration can be performed.
	Port description	A textual description of the network interface where the system was found.
	System name	Hostname of the system found.
	Button: Update	Click on **Update** to update the displayed data.

6.2.7 Management >> Central Management

6.2.7.1 Configuration Pull



The mGuard can retrieve new configuration profiles from a HTTPS server in configurable time intervals, provided that the server makes them available as files for the mGuard (file ending: .atv). When a new mGuard configuration differs from the current configuration, it will be downloaded and activated automatically.

Management >> Central Management >> Configuration Pull		
Configuration Pull	**Pull Schedule**	Enter here if (and if so, when and at what intervals) the mGuard should attempt to download and apply a new configuration from the server. To do this, open the selection list and select the desired value. A new text field opens when **Time Schedule** is selected. In this field, enter whether the new configuration should be downloaded daily or repeatedly on a certain weekday, and at which time. The time-controlled download of a new configuration can only be made after synchronization of the system time (see “Management >> System Settings” on page 6-4, “Time and Date” on page 6-7). Time control sets the selected time related to the configured time zone.
	Server	IP or hostname of the server that provides the configurations.
	Directory	The directory (folder) on the server where the configuration is located.
	Filename	The name of the file in the directory defined above. If no filename is defined here, the serial number of the mGuard is used, including the ending “.atv”.

Management >> Central Management >> Configuration Pull (continued)		
	Number of times a configuration profile is ignored after it was rolled back	Default: 10 After a new configuration is retrieved, it can occur that the mGuard is no longer accessible after the configuration is put into force. A new remote configuration for correction purposes is then no longer possible. In order to rule this out, the mGuard makes the following checks: After the retrieved configuration is enforced, the mGuard tries to connect again to the configuration server based on the new configuration. The mGuard then attempts to download the newly enforced configuration once again. If this is successful, the new configuration remains. If this check is unsuccessful for whatever reason, the mGuard assumes that the newly enforced configuration profile is defective. The mGuard memorizes the MD5 total for identification purposes, then performs a rollback. Rollback means that the last (working) configuration is restored. This assumes that the new (non-functioning) configuration contains an instruction to perform a rollback if a newly loaded configuration profile is defective according to the check procedure detailed above. When the mGuard attempts to retrieve a new configuration profile periodically after the time defined in **Pull Schedule** (and **Time Schedule**), it will only accept the profile according to the following selection criterion: The configuration profile provided **must differ** from the configuration profile identified as defective that led to the rollback. (The mGuard checks the MD5 total of the old, defective and rejected configuration against the MD5 total of the new configuration profile offered.) If this selection criterion is **fulfilled** (i.e. a newer configuration profile is offered), the mGuard gets this configuration profile, enforces it and checks it according to the procedure detailed above. It also disables it if the rollback check is negative. If the selection criterion is **not fulfilled** (i.e. the same configuration profile is being offered), the selection criterion remains in force for all additional periodic requests for the period defined in the **Number of times...** field. If the defined number of times expires without a change of the configuration profile on the server, the mGuard enforces the unchanged new (“defective”) configuration profile once more, despite it being “defective”. This is to rule out the possibility that external factors (e.g. network outage) caused the check failure. The mGuard then attempts to connect to the configuration server again based on the new configuration, then downloads the newly enforced configuration profile. If this is unsuccessful, another rollback is performed. The selection criterion is enforced for further load cycles as often as is defined in the **Number of times...** field. If the value in the **Number of times...** field is defined as **0**, the selection criterion (the offered configuration profile is ignored if it remains unchanged) will never come into effect. As a result, the second of the following goals can then no longer be reached.

Management >> Central Management >> Configuration Pull (continued)

This mechanism has the following goals:

1. After enforcing the new configuration, the mGuard must still be configurable from a remote location.
2. When cycles are close together (e.g. **Pull Schedule** = 15 minutes), the mGuard must be prevented from testing a possibly defective configuration profile over and over at intervals that are too short. This can lead to the blocking of external administrative access, as the mGuard is too busy dealing with its own processes.
3. External factors (e.g. network outage) must be largely ruled out as a reason for the mGuard's decision that a configuration is defective.

An application note is provided by Innominate. This contains a description of how a rollback can be started using a configuration profile.

Download timeout (seconds)	Default: 120. Defines the maximum length of a timeout (i.e. time of inactivity) during the download of a configuration file. The download is canceled if this time is exceeded. If and when a new download attempt is made depends on the setting in *Pull Schedule* (see above).
Login	The login (user name) on the HTTPS server.
Password	The password on the HTTPS server.
Server Certificate	The certificate that the mGuard uses to check the authentication of the certificate suggested by the configuration server. It is used to prevent unauthorized configurations from being installed on the mGuard. The following may be entered here: – A self-signed certificate of the configuration server – The root certificate of the CA that created the server certificate. This is valid when the configuration server certificate is signed by a CA (instead of a self-signed one).

Management >> Central Management >> Configuration Pull (continued)

If the configuration profiles also contain the private VPN key for VPN connections or VPN connections with PSK, the following conditions must be fulfilled:

– The password should consist of at least 30 random upper and lower case letters and numbers (to prevent unauthorized access).
– The HTTPS server should only grant access to this individual mGuard using the login and password. Otherwise, users of other mGuards may be able to access this mGuard's configuration.

The IP address or the hostname specified under Server must be the same as the server certificate's Common Name (CN).

Self-signed certificates should not use the "key-usage" extension.

To install a certificate, please proceed as follows:

Requirement: The certificate file is saved on the connected computer

- Click on **Browse...** to select the file.
- Click on **Import**.

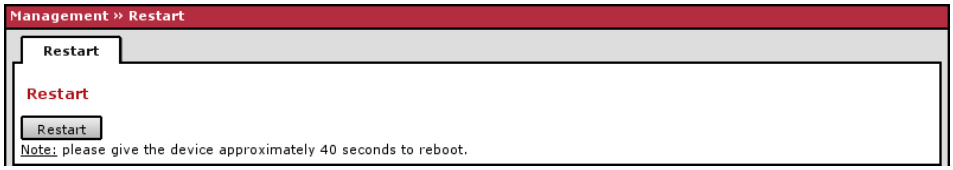
Download Test

- By clicking on **Test Download**, you can test whether the parameters are correct without actually saving the modified parameters or activating the configuration profile. The result of the test is displayed in the right column.

Ensure that the profile on the server does not contain unwanted variables beginning with "GAI_PULL_", as these overwrite the set configuration.

6.2.8 Management >> Restart

6.2.8.1 Restart



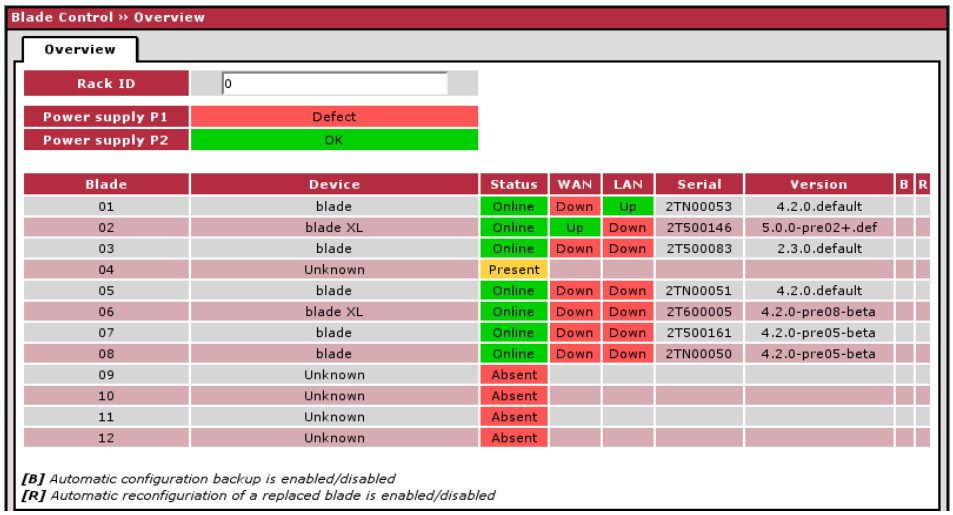
Restarts the mGuard. Has the same effect as a power outage. The mGuard is turned off and on again.

A restart (reboot) is necessary if an error occurs. It may also be necessary after a software update.

6.3 Blade Control menu

This menu is only available on the **mGuard blade controller**.

6.3.1 Blade Control >> Overview

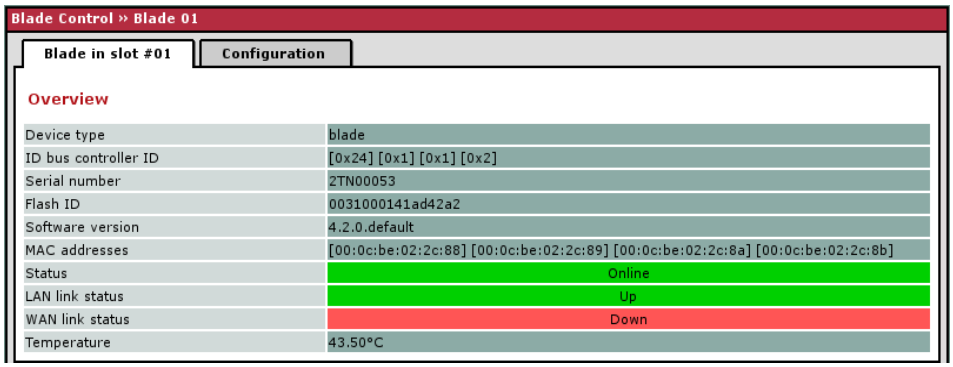


Blade Control >> Overview		
Overview	Rack ID	The ID of the rack where the mGuard is mounted. This value can be configured for all blades on the controller.
	Power supply P1/P2	State of power supply units P1 and P2. – OK – Absent – Defect – Fatal error
	Blade	Number of the slot where the mGuard blade is installed.
	Device	Device name, e.g. “blade” or “blade XL”.
	Status	– **Online –** The device in the slot is working correctly. – **Present –** Device is present but not yet ready (e.g. in start-up phase). – **Absent –** No device found in the slot.
	WAN	Status of the WAN port.
	LAN	Status of the LAN port.
	Serial	The serial number of the mGuard.
	Version	The software version of the mGuard.
	B	**Backup:** Automatic configuration backup on the controller is activated / deactivated for this slot.
	R	**Restore:** Automatic configuration restoration after replacing the mGuard is activated / deactivated for this slot.

6.3.2 Blade Control >> Blade 01 to 12

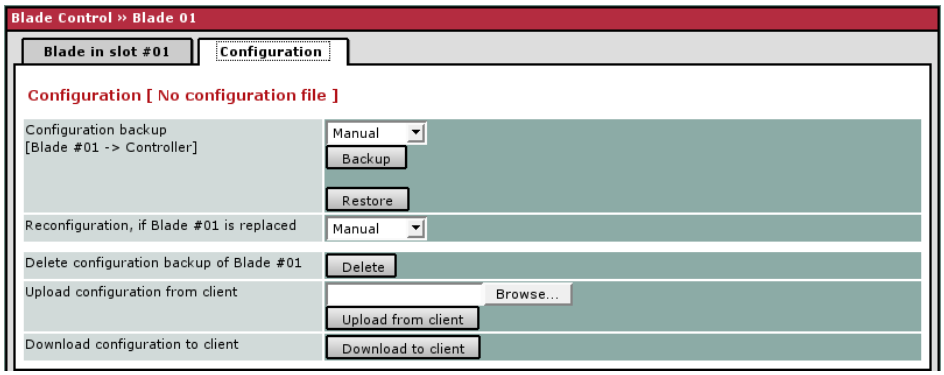
These pages show the status information of each installed mGuard and allow the configuration backup and restoration of the respective mGuard.

6.3.2.1 Blade in slot #...



Blade Control >> Blade xx >> Blade in slot xx		
Overview	**Device type**	Device name, e.g. “blade” or “blade XL”.
	ID bus controller ID	ID of this slot on the control bus of the bladeBase.
	Serial number	The serial number of the mGuard.
	Flash ID	Flash ID of the mGuard’s flash memory.
	Software version	Software version installed on the mGuard.
	MAC addresses	All MAC addresses used by the mGuard.
	Status	Status of the mGuard.
	LAN link status	Status of the LAN port.
	WAN link status	Status of the WAN port.

6.3.2.2 Configuration



Blade Control >> Blade xx >> Configuration

Configuration

The status of the stored configuration is displayed for each blade:

[No configuration file]

[Obsolete]

[Current]

[File will be copied]

[Blade has been replaced]

[---] No blade available

Configuration backup [Blade #__ -> Controller]

- **Automatic:** The new configuration is stored automatically on the controller shortly after a configuration change on the mGuard.
- **Manual:** The configuration can be stored on the controller using the **Backup** button.
- With the **Restore** button, the configuration stored on the controller can be transferred to the mGuard.

If the blade was reconfigured after a manual configuration storage, but the new configuration was not stored, the configuration stored on the controller is out of date. This is indicated on the *Configuration* tab page by “Configuration [obsolete]”.
This indicates that something has been overlooked: In this case, you must backup the configuration on the controller.

Reconfiguration, if mGuard blade is replaced

After replacing an mGuard in this slot, the configuration stored on the controller will be automatically transferred to the new mGuard in this slot.

Delete configuration backup of Blade #__

Deletes the configuration stored on the controller for the device in this slot.

Upload configuration from client

Uploads and saves the configuration profile for this slot onto the controller.

Download configuration to client

Downloads the configuration profile stored on the controller for this slot onto the configuration PC.

6.4 Network menu

6.4.1 Network >> Interfaces

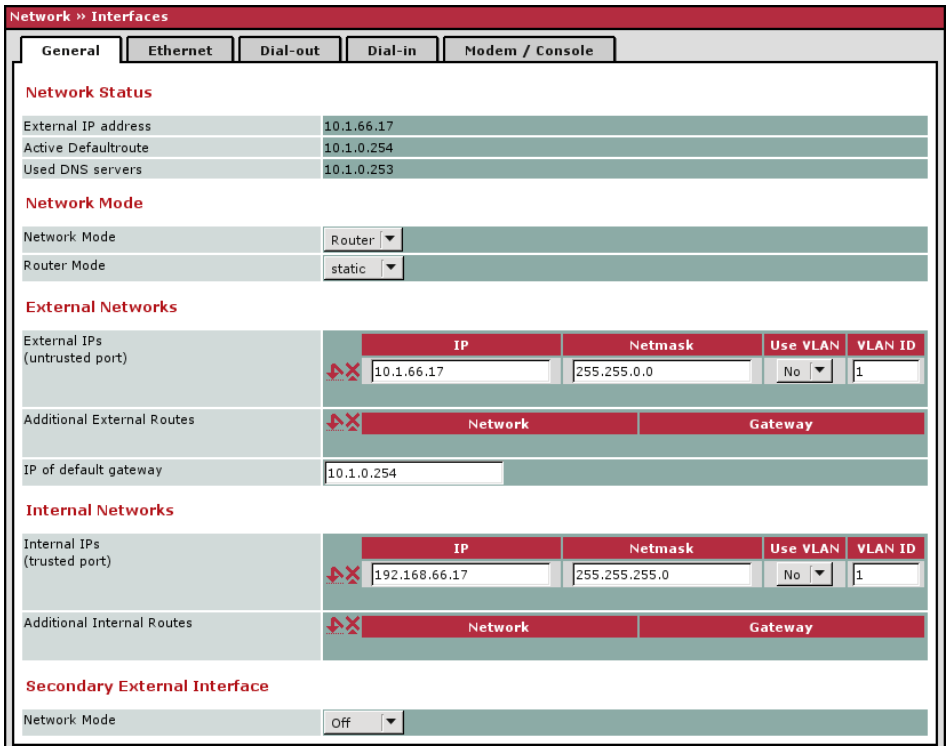
The mGuard has the following interfaces with external access:

	Ethernet: Internal: LAN External: WAN	Serial ports	Built-in Modem
mGuard Smart	**Yes**	**No**	**No**
mGuard centerport, mGuard industrial RS, mGuard blade, EAGLE mGuard, mGuard delta	**Yes**	**Yes**	**No**
Optional: mGuard industrial RS	**Yes**	**Yes**	**Yes**

The LAN port is connected to a single computer or to the local network (= internal). The WAN port is for the connection to the external network. For devices with a serial port, the connection to the external network can also or additionally be made over the serial port via a modem. Alternatively, the serial port can be used as follows: For PPP dial-in into the local network or for configuration purposes. For devices with a built-in modem (analog modem or ISDN terminal adapter), the modem can be used additionally to combine access possibilities.

The details for this must be configured on the *General, Ethernet, Outgoing Call, Incoming Call* and *Modem / Console* tab pages. For further explanations of the possibilities for using the serial ports (and a built-in modem) see “Modem / Console” on page 6-89.

6.4.1.1 General



Network >> Interfaces >> General		
Network Status	**External IP address (WAN port address)**	Display only: The addresses through which the mGuard can be accessed by devices from the external network. They form the interface to other parts of the LAN or to the Internet. If the transition to the Internet takes place here, the IP addresses are usually designated by the Internet Service Provider (ISP). If an IP address is assigned dynamically to the mGuard, you can find the currently valid IP address here. In *Stealth* mode, mGuard adopts the address of the connected local computer as its external IP.
	Network Mode Status	Displays the status of the selected network mode.
	Active Defaultroute	Display only: The IP address that the mGuard uses to try to reach unknown networks is displayed here. This field can contain “none” if the mGuard is in *Stealth* mode.
	Used DNS servers	Display only: The name of the DNS servers used by the mGuard for name resolution are displayed here. This information can be useful, for example, if the mGuard is using the DNS servers designated to it by the Internet Service Provider.

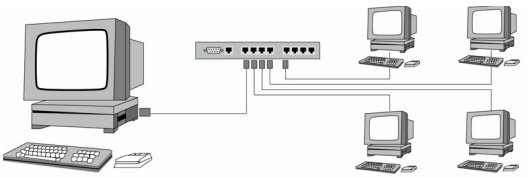
Network >> Interfaces >> General (continued)		
Network Mode	**Network Mode**	**Stealth / Router** The mGuard must be set to the network mode that corresponds to its connection to the network (see also “Typical Application Scenarios” on page 2-1).. Depending on which network mode the mGuard is set to, the page will change together with its configuration parameters. See: “Stealth (default setting on mGuard industrial RS, mGuard smart, mGuard PCI, EAGLE mGuard)” on page 6-58 and “Network Mode: Stealth” on page 6-62 “Router (factory default for mGuard centerport, mGuard blade controller, mGuard delta)” on page 6-59 and “Network Mode: Router” on page 6-72
Router Mode	Only used when the “Router” network mode is selected.	**Static / DHCP / PPPoE / PPTP / Modem[1] / Built-in Modem[1]** See: “Router Mode: static” on page 6-60 and “Network Mode = Router, Router Mode = PPTP” on page 6-77 “Router Mode: DHCP” on page 6-60 and “Network Mode = Router, Router Mode = DHCP” on page 6-75 “Router Mode: PPPoE” on page 6-60 and “Network Mode = Router, Router Mode = PPPoE” on page 6-76 “Router Mode: PPTP” on page 6-60 and “Network Mode = Router, Router Mode = PPTP” on page 6-77 “Router Mode: Modem” on page 6-61 and “Network Mode = Router, Router Mode = Modem / Built-in Modem” on page 6-78 “Router Mode: Built-in Modem” on page 6-61 and “Network Mode = Router, Router Mode = Modem / Built-in Modem” on page 6-78

[1] Modem / Built-in Modem is not available with all mGuard models (see “Network >> Interfaces” on page 6-55)

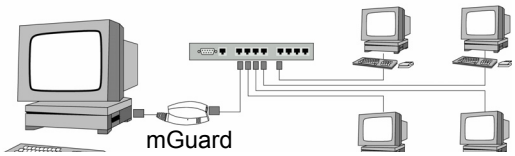
Stealth (default setting on mGuard industrial RS, mGuard smart, mGuard PCI, EAGLE mGuard)

Stealth mode is used to protect a single computer or local network with the mGuard. Important: If the mGuard is in the *Stealth* network mode, it is inserted into the existing network (see illustration) without changing the existing network configuration of the connected devices.

Before:



After:



(A LAN can also be on the left.)

The mGuard will analyze the network traffic passing through it and configure its network connection accordingly. It will then operate transparently, i.e. without the computers having to be reconfigured.

As in the other modes, firewall and VPN security functions are available.

Externally delivered DHCP data is passed through to the connected computer.

If the mGuard provides services such as VPN, DNS, NTP, etc., a firewall installed on the computer must be configured to allow ICMP Echo Requests (ping).

In *Stealth* mode, the mGuard uses 1.1.1.1 as its internal IP address. This is accessible when the configured default gateway of the computer is also accessible.

In the *Stealth* network mode, a secondary external interface can also be configured (see “Secondary External Interface” on page 6-66).

For the further configuration of the *Stealth* network mode, see “Network Mode: Stealth” on page 6-62.

Router (factory default for mGuard centerport, mGuard blade controller, mGuard delta)

If the mGuard is in *Router* mode, it serves as a gateway between different subnetworks and has both an external interface (WAN port) and an internal interface (LAN port) with at least one IP address.

WAN Port

The mGuard is connected to the Internet or other external parts of the LAN over the WAN port.

– mGuard smart: The WAN port is the Ethernet socket.

LAN Port

The mGuard is connected to a local network or a single computer over the LAN port.

– mGuard smart: The LAN port is the Ethernet connector.
– mGuard PCI:
  In *Driver* mode, the LAN port is represented by the operating system's network interface card (here: mGuard PCI) configuration.
  In *Power-over-PCI* mode, the LAN port is the LAN socket of the mGuard PCI.

As in the other modes, firewall and VPN security functions are available.

If the mGuard is operated in *Router* mode, it must be set as the default gateway in the connected local computers.

In other words, the IP address of the mGuard LAN port must be entered as the default gateway on these computers.

NAT should be activated if the mGuard is operated in *Router* mode and establishes the connection to the Internet (see "Network >> NAT" on page 6-95).

Only then can the computers in the connected local network access the Internet over the mGuard. If NAT is not activated, it is possible that only VPN connections can be used.

In the *Router* network mode, a secondary external interface can also be configured (see "Secondary External Interface" on page 6-66).

There are several router modes, depending on the Internet connection:

– static
– DHCP
– PPPoE
– PPPT
– Modem
– Built-in Modem

Router Mode: static

The IP address is set permanently.

Router Mode: DHCP

The IP address is assigned via DHCP.

Router Mode: PPPoE

PPPoE mode corresponds to the Router mode with DHCP – with one difference: The PPPoE protocol, which is used by many DSL modems for DSL Internet access, is used for connecting to the external network (Internet or WAN). The external IP address that the mGuard uses for access from remote peers is assigned by the Internet Service Provider.

If the mGuard is operated in *PPPoE* mode, it must be set as the default gateway in the connected local computers.

In other words, the IP address of the mGuard LAN port must be entered as the default gateway on these computers.

If the mGuard is operated in *PPPoE* mode, NAT must be activated in order to gain access to the Internet.

If NAT is not activated, it is possible that only VPN connections can be used.

For the further configuration of the *PPPoE* network mode, see “Network Mode = Router, Router Mode = PPPoE” on page 6-76.

Router Mode: PPTP

Similar to the *PPPoE* mode. In Austria, for example, the PPTP protocol is used instead of the PPPoE protocol for DSL connections.

PPTP is the protocol that was originally used by Microsoft for VPN connections.

If the mGuard is operated in *PPTP* mode, it must be set as the default gateway in the connected local computers.

In other words, the IP address of the mGuard LAN port must be entered as the default gateway on these computers.

If the mGuard is operated in *PPTP* mode, NAT should be activated in order to gain access to the Internet from the local network (see “Network >> NAT” on page 6-95).

If NAT is not activated, it is possible that only VPN connections can be used.

For the further configuration of the *PPTP* network mode, see “Network Mode = Router, Router Mode = PPTP” on page 6-77.

Router Mode: Modem

Only used for *mGuard industrial RS* **without a** built-in modem, mGuard centerport, *mGuard blade, EAGLE mGuard, mGuard delta*

If the *Modem* network mode is selected, the external Ethernet interface of the mGuard is deactivated and data transfer to and from the WAN is made over the serial port that is accessible externally.

An external modem that establishes the connection to the telephone network is connected to the serial port. Connection to the WAN or Internet is then made over the telephone network using the external modem.

If the address of the mGuard is changed (e.g. by changing the network mode from *Stealth* to *Router*), the device is only accessible under the new address. When the change is made over the LAN port, a message is displayed with the new address before the change becomes active. When the configuration is changed over the WAN port you will not receive feedback from the mGuard.

If you set the mode to *Router*, *PPPoE* or *PPTP* and then change the IP address of the LAN port and/or the local netmask, make sure you enter the correct values. Otherwise, the mGuard may no longer be accessible.

For the further configuration of the *Built-in Modem / Modem* network mode, see “Network Mode = Router, Router Mode = Modem / Built-in Modem” on page 6-78.

Router Mode: Built-in Modem

Only used for *mGuard industrial RS* **with** built-in modem or ISDN terminal adapter

If the *Built-in Modem* network mode is selected, the external Ethernet interface of the mGuard is deactivated and data transfer to and from the WAN is made over the modem or ISDN terminal adapter installed in the mGuard. This must be connected to the telephone network. Internet connection is then made over the telephone network.

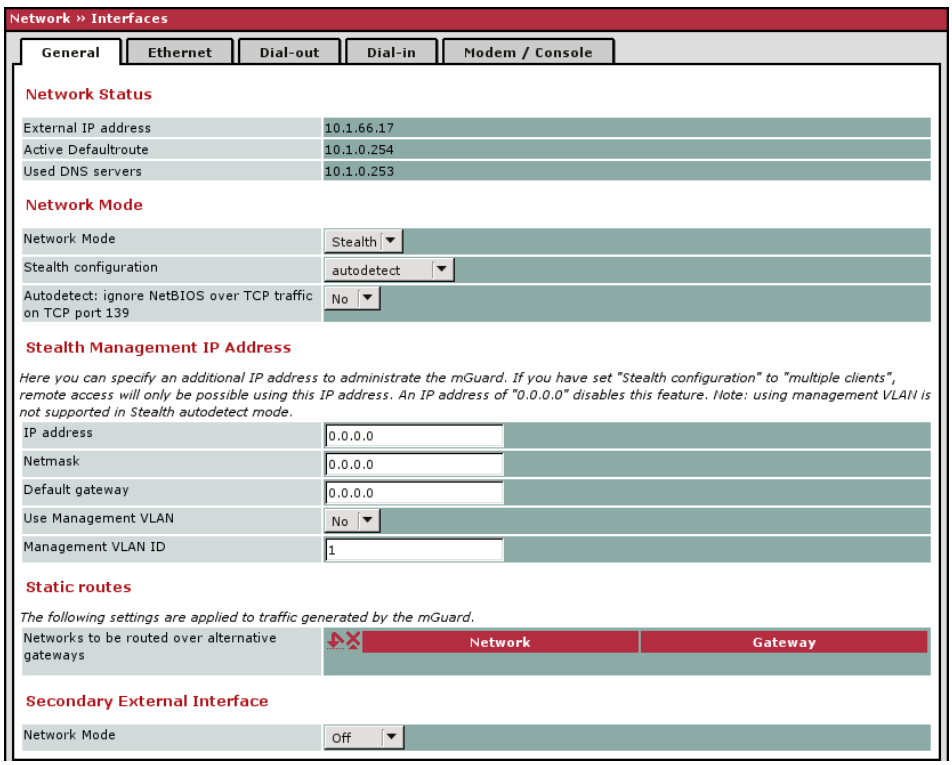
After *Built-in Modem* is selected, the text fields used for defining modem connection parameters are displayed.

For the further configuration of the *Built-in Modem / Modem* network mode, see “Network Mode = Router, Router Mode = Modem / Built-in Modem” on page 6-78.

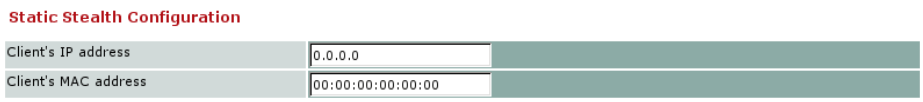
Network Mode: Stealth

Default setting on mGuard industrial RS, mGuard smart, mGuard PCI, EAGLE mGuard

When the “Stealth” network mode is selected ...



... and for Stealth configuration “static”



Network >> Interfaces >> General (Stealth network mode)

Network Mode

Only valid when the “Stealth” network mode is selected.

Stealth configuration **autodetect / static / multiple clients**

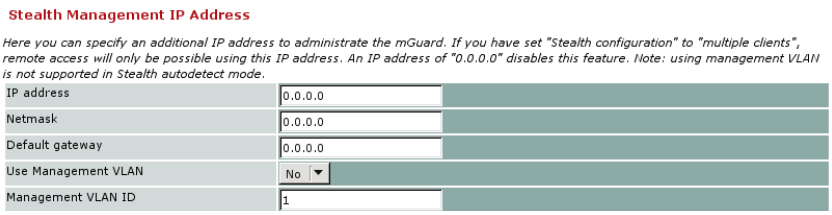
autodetect

(Default) The mGuard analyzes the network traffic and independently configures its network connection accordingly. It functions transparently.

Network >> Interfaces >> General (Stealth network mode) (continued)		
		static If the mGuard cannot analyze the network traffic (e.g. because the connected local computer only receives data), then the *Stealth configuration* must be set to **static**. In this case, further text fields are provided for the static stealth configuration. **multiple clients** As with **autodetect**, but it is possible to connect more than one computer to the mGuard LAN port (secure port), meaning that several IP addresses can be used here.
	Autodetect: ignore NetBIOS over TCP traffic on TCP Port 139	**Yes / No** Only with automatic Stealth configuration: If a Windows computer has more than one network card installed, it can happen that it alternates between the different IP addresses for the sender address in the data packets it sends. This applies to network packets that the computer sends to TCP Port 139 (NetBIOS). As the mGuard determines the address of the computer from the sender address (and thus the address at which the mGuard can be accessed), the mGuard would have to switch back and forth, and this would hinder its operation considerably. To avoid this, set this switch to **Yes** if you have connected the mGuard to a computer that has these properties.

Network >> Interfaces >> General (Stealth network mode) (continued)

Stealth Management IP Address


Stealth Management IP Address
Here you can specify an additional IP address to administrate the mGuard. If you have set "Stealth configuration" to "multiple clients", remote access will only be possible using this IP address. An IP address of "0.0.0.0" disables this feature. Note: using management VLAN is not supported in Stealth autodetect mode.
IP address
0.0.0.0
Netmask
0.0.0.0
Default gateway
0.0.0.0
Use Management VLAN
No
Management VLAN ID
1

An additional IP address can be specified here for the administration of the mGuard.

Remote access via HTTPS, SNMP and SSH is **only** possible using this address if:

– *Stealth configuration* is set to the option **multiple clients**
– the client does not answer ARP requests, or
– no client is available.

With the *static* stealth configuration, the *Stealth Management IP Address* is always accessible, even when the network card of the client PC is not activated.

If the secondary external interface is activated (see “Secondary External Interface” on page 6-66), the following applies:

If the routing settings are such that the data traffic to the **Stealth Management IP Address** would be routed via the secondary external interface, this would be an exclusion situation, i.e. the mGuard could not be administered locally any more.

To prevent this, the mGuard has a built-in mechanism that ensures that in such a case, the Stealth Management IP Address can still be accessed by the locally connected computer (or network).

IP address — The additional IP address for contact and administration of the mGuard.
The IP address “0.0.0.0” disables the management IP address.

Netmask — The netmask for the IP address above.

Default gateway — The default gateway of the network where the mGuard is located.

Use Management VLAN: Yes / No — If this IP address should be contained within a VLAN, then this option must be set to “Yes”.

Management VLAN ID — A VLAN ID between 1 and 4095.

VLAN is not supported for the management IP address during *autodetect* stealth configuration.

An explanation of this term can be found in the glossary on “VLAN” on page 8-7.

Network >> Interfaces >> General (Stealth network mode) (continued)

Static routes

In *Stealth* mode, the mGuard adopts the default gateway of the computer connected to the LAN port. Alternative routes can be defined for data packets in WAN created by the mGuard. Among others, the following data traffic packets belong here:

– The download of certificate revocation lists (CRL)
– The download of a new configuration
– Communication with an NTP server (for time synchronization)
– Dispatch and receipt of encrypted data packets from VPN connections
– Queries to DNS servers
– Syslog messages
– The download of firmware updates
– The download of configuration profiles from a central server (if configured)
– SNMP traps

If this option is used, make the relevant entries afterwards. If it is not used, the affected data packages are transmitted over the default gateway defined by the client.

Static routes
The following settings are applied to traffic generated by the mGuard.
Networks to be routed over alternative gateways
Network
Gateway

Network — Enter the network using CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

Gateway — The gateway where this network can be accessed.

The routes defined here are valid unconditionally for data packets created by the mGuard. This definition takes priority over other settings (see also “Example of a network” on page 6-214).

Internal Networks

See “Internal Networks” on page 6-72.

Static Stealth Configuration

Client’s IP address — The IP address of the computer connected to the LAN port.

Client’s MAC address — The physical address of the network adapter in the local computer where the mGuard is connected.

- The MAC address can be determined as follows: On the DOS level (Start, Programs, Accessories, Command Prompt), enter the following command: `ipconfig /all`

The entry of a MAC address is not absolutely necessary. The mGuard can obtain the MAC address automatically from the client. The MAC address 0:0:0:0:0:0 must be entered in order to do this. Please note that the mGuard can only forward the network packets through to the client after the MAC address has been determined.

If no *Stealth Management IP Address* or *Client’s MAC address* is configured in static Stealth mode, then DAD ARP requests are sent to the internal interface (see RFC2131, section 4.4.1).

Network >> Interfaces >> General (Stealth network mode) (continued)

Secondary External Interface

Only on *Router* network mode **with** *static* router mode, or *Stealth* network mode.
Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*:

In these network modes, the serial port of the mGuard can be configured as an additional **secondary external interface**.

The secondary external interface can be used to transfer data *permanently* or *temporarily* into the external network (WAN).

If the secondary external interface is activated, the following applies:

In *Stealth* network mode

Only the data traffic created by the mGuard is subject to the routing specified for the secondary external interface, not the data traffic coming from a locally connected computer. Locally connected computers cannot be accessed remotely either, only the mGuard can be accessed remotely – if the configuration permits this.

VPN data traffic can – as in the Router network mode – flow to and from the locally connected computers. Because this traffic is encrypted by the mGuard and is therefore seen as generated by the mGuard.

In *Router* network mode

All data traffic, i.e. from and to locally connected computers and that which is generated by the mGuard, can be fed into the external network (WAN) via the secondary external interface.

Network Mode: Off / Modem

Off

(Default). Select this setting if the operating environment of the mGuard does not require a secondary external interface. You can then use the serial port (or the built-in modem, if there is one) for other purposes (see “Modem / Console” on page 6-89).

Modem / Built-in Modem

If you select one of these options, the secondary external interface will be used to transfer data *permanently* or *temporarily* into the external network (WAN).

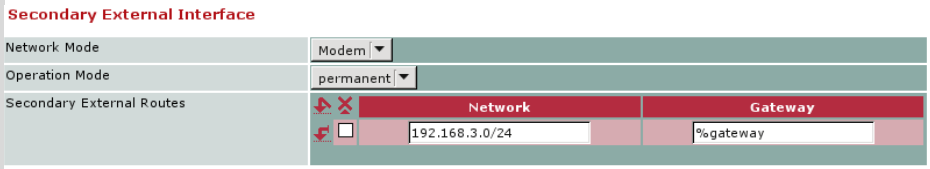
The secondary external interface is formed by the serial port of the mGuard and an external modem connected to it.

Network >> Interfaces >> General (Stealth network mode) (continued)

Operation Mode

permanent / temporary

After selecting the *Modem* or *Built-in Modem* network mode for the secondary external interface, you must specify the operation mode of the secondary external interface.



permanent

Data packets whose destination corresponds to the routing settings defined for the secondary external interface are always routed over this external interface. The secondary external interface is always activated.

temporary

Data packets whose destination corresponds to the routing settings defined for the secondary external interface are only routed over this external interface when additional conditions to be defined are fulfilled. Only then is the secondary external interface activated, and the routing settings for the secondary external interface become effective (see “Probes for Activation” on page 6-69).

Secondary External Routes

Network

Here you make the entries for the routing to the external network. You can make multiple routing entries. Data packets intended for these networks are then routed to the corresponding network over the secondary external interface – in *permanent* or *temporary* mode.

Gateway

Enter the IP address of the gateway over which the transfer is made in the above-named external network – if this IP address is known.

When you are dialing in to the Internet using the phone number of the ISP, the address of the gateway is usually only known after the dial-in. In this case, you enter **%gateway** in the field as a placeholder.

Operation Mode: permanent / temporary

In both the **permanent** and **temporary** operation modes, the modem must be available to the mGuard for the secondary external interface so that the mGuard can make a connection to the WAN (Internet) over the telephone network connected to the modem.

Which data packets are transferred over the **primary external interface** (Ethernet interface) and which are transferred over the **secondary external interface** is determined by the routing settings in effect for these two external interfaces. Therefore an interface can only take a data packet if the routing setting for that interface matches the destination of the data packet.

The following rules apply to the use of routing entries.

If multiple routing entries for the destination of a data packet match, then the smallest network defined in the routing entries that matches the data packet decides which route this packet takes.

Example:

– The external route of the **primary** external interface is entered as 10.0.0.0/8, while the external route of the **secondary** external interface is entered as 10.1.7.0/24. Data packets to network 10.1.7.0/24 are then routed over the secondary external interface, although the routing entry for the primary external interface also matches them. Reason: The routing entry for the secondary external interface indicates a smaller network (10.1.7.0/24 < 10.0.0.0/8).
– (This rule does not apply in *Stealth* network mode regarding the Stealth Management IP Address – see “Stealth Management IP Address” on page 6-64.)
– If the routing entries for the primary and secondary external interfaces are identical, then the secondary external interface “wins”, i.e. the data packets with a matching destination address are routed over the secondary external interface.
– The routing settings for the secondary external interface only become effective when the secondary external interface is activated. Particular attention must be paid to this if the routing entries for the primary and secondary external interfaces overlap or are identical, whereby the priority of the secondary external interface has a filter effect, with the following result: Data packets whose destination matches both the primary and secondary external interfaces are always transferred over the secondary external interface, but only if this is activated.
– In the **temporary** operation mode, “activated” signifies the following: Only when certain conditions are fulfilled is the secondary external interface activated, and only then do the routing settings of the secondary external interface become effective.
– Network address 0.0.0.0/0 generally signifies the largest definable network, i.e. the Internet.

In the Router network mode, the local network connected to the mGuard can be accessed via the secondary external interface as long as the firewall settings are defined to allow this.

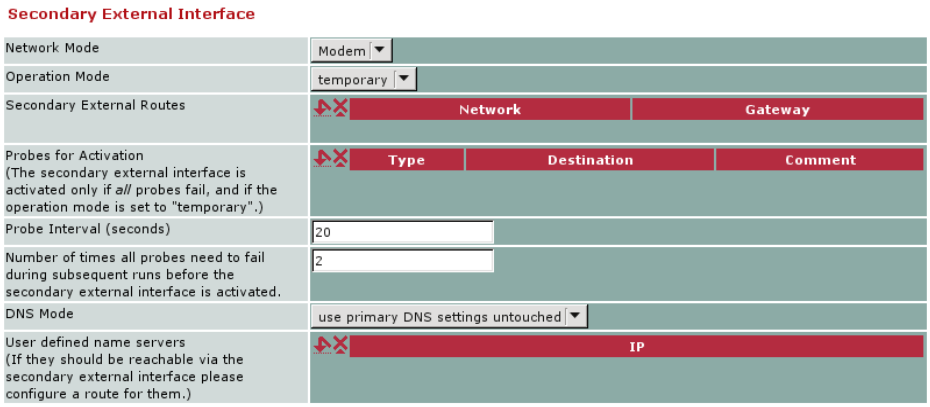
Network >> Interfaces >> General (continued); Secondary External Interface (continued)

Secondary External Interface (continued)

Network Mode = Modem

Operation Mode = temporary

Probes for Activation


Secondary External Interface
Network Mode
Modem
Operation Mode
temporary
Secondary External Routes
Network
Gateway
Probes for Activation
(The secondary external interface is activated only if all probes fail, and if the operation mode is set to "temporary".)
Type
Destination
Comment
Probe Interval (seconds)
20
Number of times all probes need to fail during subsequent runs before the secondary external interface is activated.
2
DNS Mode
use primary DNS settings untouched
User defined name servers
(If they should be reachable via the secondary external interface please configure a route for them.)
IP

If the operation mode of the secondary external interface is set to **temporary**, then the following is checked using periodic ping probes: Can a particular destination or destinations be reached when data packets take the route based on all the routing settings defined for the mGuard – apart from those defined for the secondary external interface? Only if **none** of the ping probes is successful does the mGuard assume that it is currently not possible to reach the destination(s) over the primary external interface (= Ethernet interface over WAN port of the mGuard). In this case the secondary external interface is activated, which results in the data packets being routed over this interface.

The secondary external interface remains activated until the mGuard detects in subsequent ping probes that the destination(s) can be reached again. When this condition is fulfilled, the data packets are routed over the **primary** external interface again and the **secondary** external interface is deactivated.

Therefore the purpose of the ongoing ping probes is to check whether specific destinations can be reached over the primary external interface. When they cannot be reached, the secondary external interface is activated until they can be reached again.

Type / Destination

Specify the ping **Type** for the ping request packet that the mGuard will send to the device with the IP address that you enter under **Destination**.

You can configure multiple ping probes for different destinations.

Success / failure:

A ping probe is successful if the mGuard receives a positive response to the outgoing ping request packet within 4 seconds. If the response is positive, the remote peer can be reached.

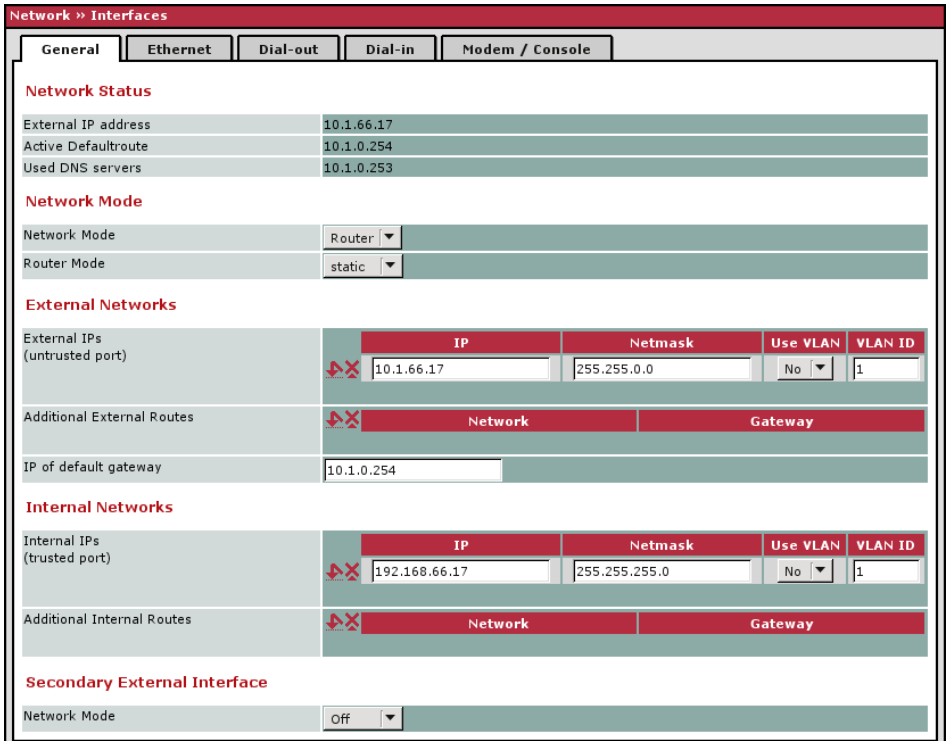
Network >> Interfaces >> General (continued); Secondary External Interface (continued)		
		Ping types: – IKE Ping: Determines whether a VPN gateway can be reached at the IP address entered. – ICMP Ping: Determines whether a device can be reached at the IP address entered. This is the most common ping probe. However, the response to this ping probe is switched off on some devices, so that they do not respond even though they can be reached. – DNS Ping: Determines whether a functioning DNS server can be reached at the IP address entered. A generic request is sent to the DNS server with the specified IP address, and every DNS server that can be reached responds to this request. Please note the following when programming ping probes: It makes sense to program multiple ping probes. This is because it is possible that an individual probed service is currently undergoing maintenance. In such a case, the result should not be that a secondary external interface is activated and a cost-incurring dial connection over the telephone network is set up. Because the ping probes generate network traffic, the number of probes and their frequency should be kept within reasonable limits. You also want to avoid activating the secondary external interface too early. The timeout period for the individual ping requests is 4 seconds. This means that after a ping probe is started, the next ping probe starts after 4 seconds if the previous one was negative. To take this aspect into account, you make the following settings.
	Probe Interval (seconds)	The ping probes defined above under **Probes for Activation** are performed one after the other. When the ping probes defined are performed once in sequence, this is known as a *probe run*. Probe runs are performed continuously at intervals. The interval entered in this field specifies how long the mGuard waits after starting a probe run before it starts the next probe run. The probe runs are not necessarily performed to completion: As soon as one ping probe in a probe run is successful, the subsequent ping probes in this probe run are omitted. If a probe run takes longer than the interval specified, then the subsequent probe run is started directly after it.

Network >> Interfaces >> General (continued); Secondary External Interface (continued)		
	Number of times all probes need to fail during subsequent runs before the secondary external interface is activated	Specifies how many sequentially performed probe runs must return a negative result before the mGuard activates the secondary external interface. The result of a probe run is negative if **none** of the ping probes it contains were successful. The number specified here also indicates how many consecutive probe runs must be successful after the secondary external interface has been activated, before this interface is deactivated again.
	DNS Mode	Only relevant if the secondary external interface is activated in the **temporary** operation mode: The DNS mode selected here specifies which DNS server the mGuard uses for temporary connections set up over the secondary external interface. – Use primary DNS settings untouched – DNS Root Servers – Provider defined (via PPP dial-up) – User defined (servers listed below) **Use primary DNS settings untouched** The DNS servers defined under Network --> DNS Server (see “Network >> NAT” on page 6-95) are used. **DNS Root Servers** Queries are sent to the root servers in the Internet whose IP addresses are stored in the mGuard. These addresses rarely change. **Provider defined (via PPP dial-up)** The domain name servers of the Internet Service Provider that provide access to the Internet are used. **User defined (servers listed below)** If this setting is selected, the mGuard will connect to the domain name servers shown in the subsequent list of *User defined name servers*.
	User defined name servers	You can enter the IP addresses of domain name servers in this list. The mGuard uses this list for communication over the secondary external interface – as long as the interface is activated temporarily and the **DNS Mode** (see above) is specified as *User defined* for this case.

Network Mode: Router

Factory default for mGuard centerport, mGuard delta and mGuard blade controller

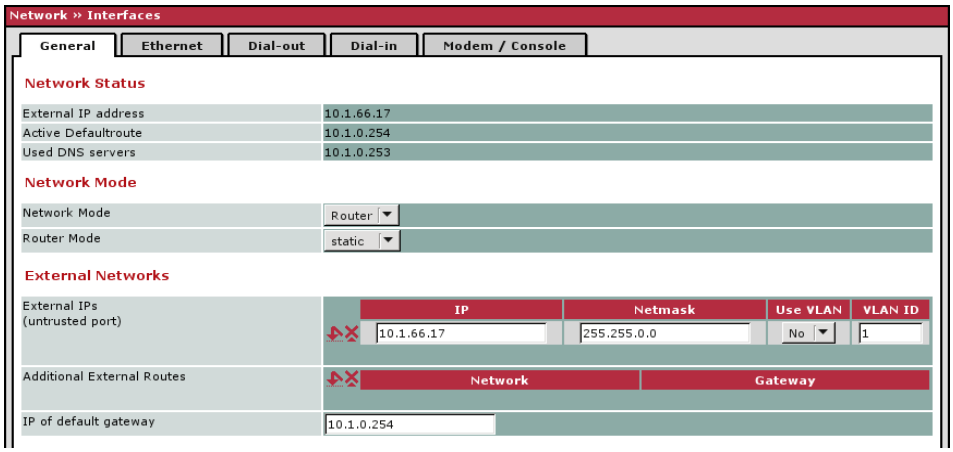
When “Router” network mode and “static” router mode are selected (see page 6-74)



Network >> Interfaces >> General (Router network mode)		
Internal Networks	**Internal IPs (trusted port)**	The internal IP is the IP address where the mGuard can be accessed by devices on the locally connected network. The factory defaults for **Router** / **PPPoE** / **PPTP** / **Modem** mode are as follows: – IP address: **192.168.1.1** – Netmask: **255.255.255.0** You can also specify other addresses where the mGuard can be accessed by devices on the locally connected network. For example, this can be useful if the locally connected network is divided into subnetworks. Multiple devices on different subnetworks can then access the mGuard under different addresses.
	IP	IP address where the mGuard is accessible over the LAN port.
	Netmask	The netmask of the network connected to the LAN port.
	Use VLAN	If this IP address should be located within a VLAN, this option must be set to **Yes**.

Network >> Interfaces >> General (Router network mode) (continued)		
	VLAN ID	– A VLAN ID between 1 and 4095. – An explanation of the term “VLAN” can be found in the glossary on 8-7. – If you want to delete entries from the list, please note that the first entry cannot be deleted.
	Additional Internal Routes	Additional routes can be defined if further subnetworks are connected to the local network.
	Network	Enter the network using CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).
	Gateway	The gateway where this network can be accessed. See also “Example of a network” on page 6-214.
Secondary External Interface	See “Secondary External Interface” on page 6-66.	

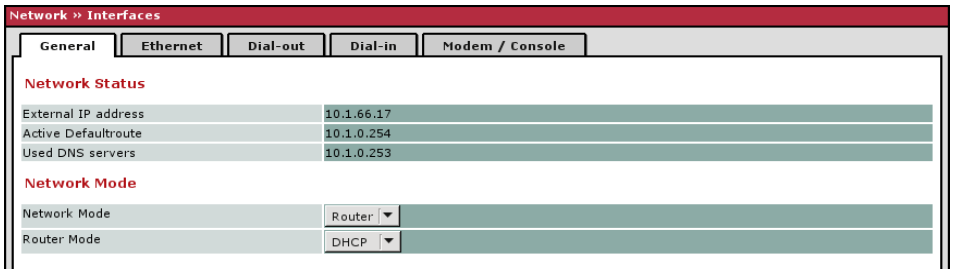
Network Mode = Router, Router Mode = static



Network >> Interfaces >> General (Router network mode, static router mode)		
External Networks	**External IPs (untrusted port)**	The addresses on the WAN port side where devices can access the mGuard. If the transition to the Internet takes place here, the external IP address of the mGuard is designated by the Internet Service Provider (ISP). **IP / Netmask** – IP address and netmask of the WAN port. **Use VLAN: Yes / No** – If this IP address should be located within a VLAN, this option must be set to **Yes**. **VLAN ID** – A VLAN ID between 1 and 4095. – An explanation can be found under “VLAN” on page 8-7. – If you want to delete entries from the list, please note that the first entry cannot be deleted.
	Additional External Routes	In addition to the default route over the default gateway (see below), you can define additional external routes. **Network / Gateway** (see “Example of a network” on page 6-214).
	IP of default gateway	The IP address of a device in the local network (connected to the LAN port) or the external network (connected to the WAN port) can be specified here. If the mGuard establishes the transition to the Internet, this IP address is designated by the Internet Service Provider (ISP). If the mGuard is utilized within the LAN, the IP address of the default gateway is designated by the network administrator. If the local network is not known to the external router (e.g. in case of configuration by DHCP), enter the address of your local network underNetwork >> NAT (see page 6-95).

Network >> Interfaces >> General (Router network mode, static router mode)	
Internal Networks	See “Internal Networks” on page 6-72.
Secondary External Interface	See “Secondary External Interface” on page 6-66.

Network Mode = Router, Router Mode = DHCP

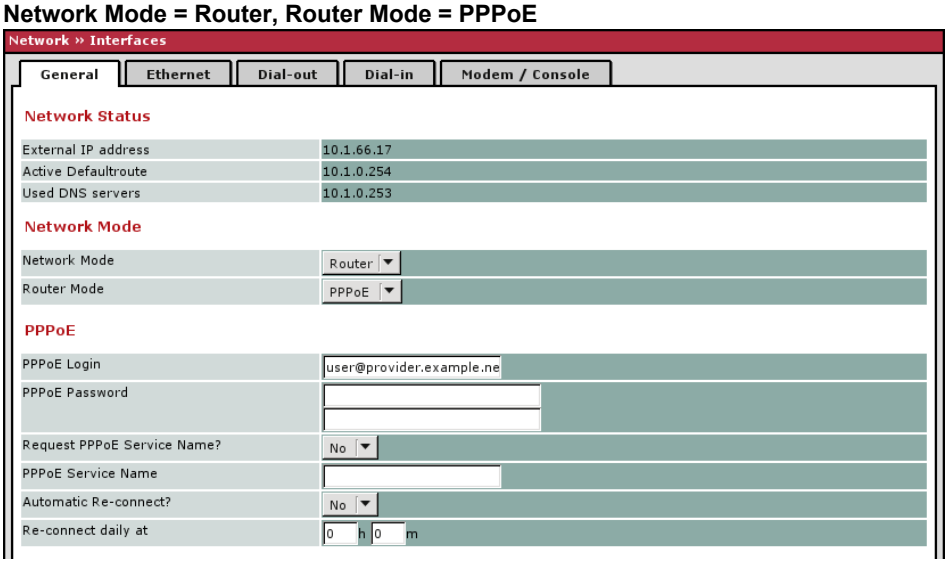


There are no additional setting options for Network Mode = Router and Router Mode = DHCP.

Network >> Interfaces >> General (Router network mode, DHCP router mode)	
Internal Networks	See “Internal Networks” on page 6-72.
Secondary External Interface	See “Secondary External Interface” on page 6-66.

Network Mode = Router, Router Mode = PPPoE

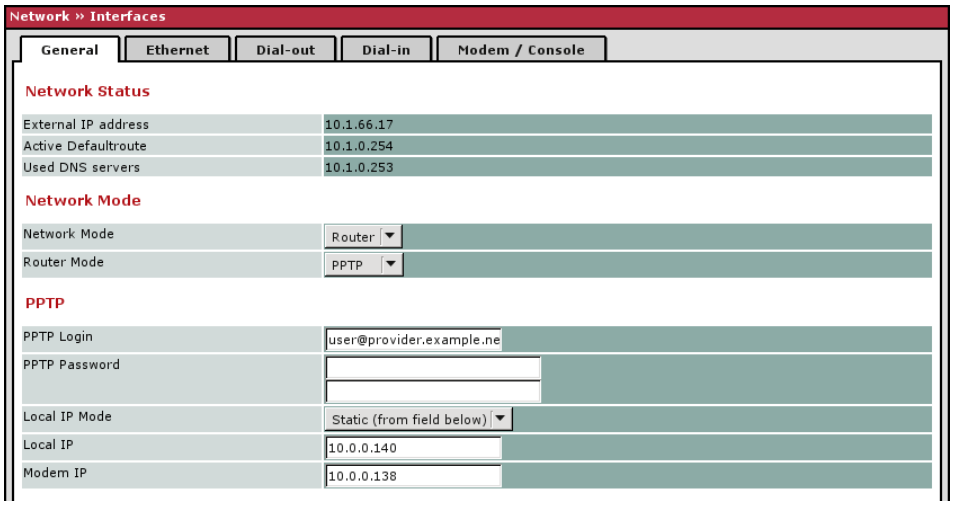
When “Router” network mode and “PPPoE” router mode are selected



Network >> Interfaces >> General (Router network mode, PPPoE router mode)		
PPPoE	**For access to the Internet, the Internet Service Provider (ISP) gives the user a login name and password. These are required for connection to the Internet.**	
	PPPoE Login	The user name (Login) that is required by your Internet Service Provider (ISP) when you setup a connection to the Internet.
	PPPoE Password	The password that is required by your ISP when you setup a connection to the Internet.
	Request PPPoE Service Name?	Yes / No When “Yes” is selected, the PPPoE client of the mGuard requests the service name specified below from the PPPoE server. Otherwise, the PPPoE service name is not used.
	PPPoE Service Name	The specified PPPoE service name
	Automatic Re-connect?	Yes / No Enter the time in the **Re-connect daily at** field if you enter **Yes**. This feature is used to schedule Internet disconnection and reconnection (as required by many ISPs) so that they do not interrupt normal business operations. When this function is activated, it only comes into effect when synchronization with a time server has been made (see “Management >> System Settings” on page 6-4, “Time and Date” on page 6-7).
	Re-connect daily at	Time when *Automatic Re-connect* (see above) takes place.
Internal Networks	See “Internal Networks” on page 6-72.	
Secondary External Interface	See “Secondary External Interface” on page 6-66.	

Network Mode = Router, Router Mode = PPTP

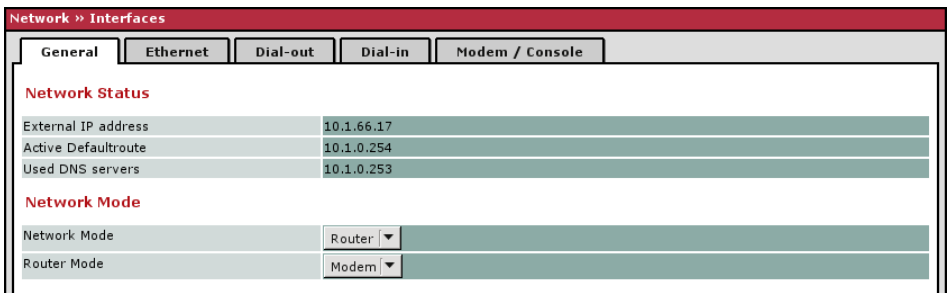
When “Router” network mode and “PPTP” router mode are selected



Network >> Interfaces >> General (Router network mode, PPTP router mode)	
PPTP	**For access to the Internet, the Internet Service Provider (ISP) gives the user a login name and password. These are required for connection to the Internet.**
	PPTP Login — The user name (Login) that is required by your Internet Service Provider when you set up a connection to the Internet.
	PPTP Password — The password that is required by your ISP when you setup a connection to the Internet.
	Local IP Mode: **Via DHCP:** If the address data for access to the PPTP server is supplied by the Internet Service Provider via DHCP, select **Via DHCP**. You then do not need to make an entry in the **Local IP** field. **Static (from field below):** If the address data for access to the PPTP server is **not** supplied by the Internet Service Provider via DHCP, then the local IP address must be entered.
	Local IP — The IP address where the mGuard can be accessed by the PPTP server.
	Modem IP — The address of the PPTP server at the Internet Service Provider.
Internal Networks	See “Internal Networks” on page 6-72.
Secondary External Interface	See “Secondary External Interface” on page 6-66.

Network Mode = Router, Router Mode = Modem / Built-in Modem

Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*



Network >> Interfaces >> General (Router network mode, Modem / Built-in Modem router mode)

Modem / Built-in Modem

The **Modem** network mode is available for:

mGuard centerport, mGuard industrial RS, mGuard blade, EAGLE mGuard, mGuard delta

The **Built-in Modem** network mode is additionally available for:

mGuard industrial RS, if this has a built-in modem or ISDN terminal adapter (optional).

In all of the devices mentioned above, data traffic is transferred over the serial port and not over the mGuard WAN port when the *Modem* or *Built-in Modem* network mode is activated. From there it is either:

– A – Transferred over the external serial port where an external modem must be connected
– B – Transferred over the built-in modem or ISDN terminal adapter (for mGuard industrial RS, when equipped)

In both cases the connection to the ISP and Internet is established over the telephone network using a modem or ISDN terminal adapter.

In the *Modem* network mode, the serial port of the mGuard is not available for the PPP dial-in option or for configuration purposes (see “Modem / Console” on page 6-89).

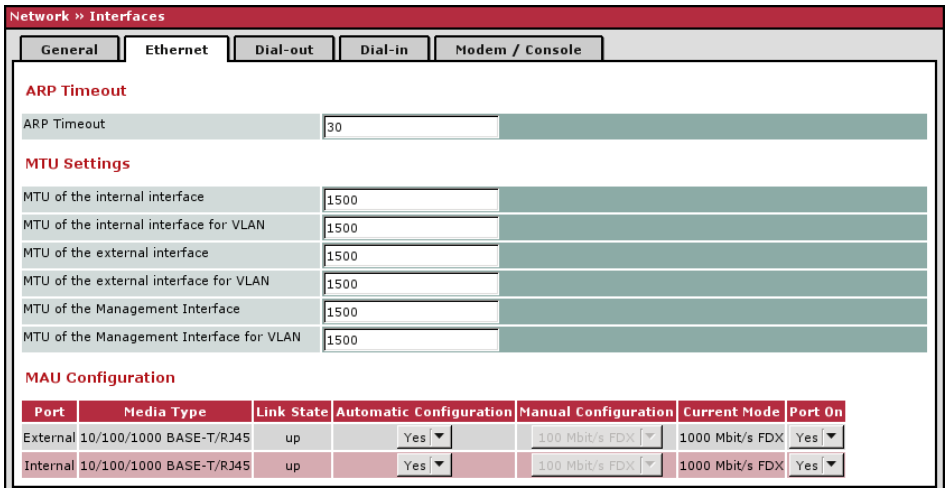
After selecting the **Modem**[1] network mode, you enter the required parameters for the modem connection on the **Dial-out** and/or **Dial-in** tab pages (see “Dial-out” on page 6-81 and “Dial-in” on page 6-86).

Enter the connection settings for an external modem on the *Modem / Console* tab page (see “Modem / Console” on page 6-89).

Configuration of the internal networks is described in the next section.

1 Also **Built-in Modem** for the mGuard industrial RS (only available as an option for the mGuard industrial RS with built-in modem / ISDN terminal adapter).

6.4.1.2 Ethernet

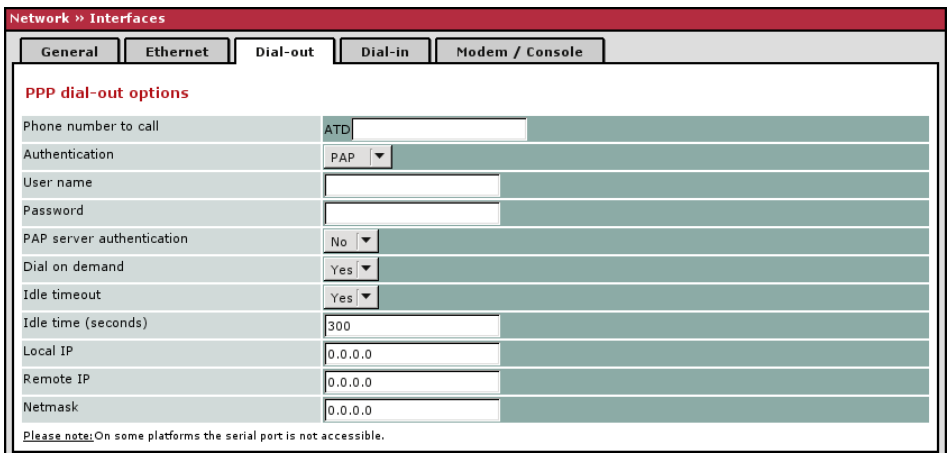


Network >> Interfaces >> Ethernet		
ARP Timeout	**ARP Timeout**	Lifetime of entries in the ARP table (in seconds).
MTU Settings	**MTU of the <name> interface**	The Maximum Transfer Unit (MTU) defines the maximum IP packet length allowed for using the respective interface. For VLAN interfaces: As VLAN packets contain 4 bytes more than those without VLAN, certain drivers may have problems in processing larger packets. Such problems can be solved by reducing the MTU to 1496.
MAU Configuration	Configuration and status display of the Ethernet ports:	
	Port	Name of the Ethernet port that the row refers to.
	Media Type	Media type of the Ethernet port.
	Link State	– **Up:** Connection is made. – **Down:** Connection is not made.

Network >> Interfaces >> Ethernet		
	Automatic Configuration	– **Yes:** Tries to determine the required operating mode automatically. – **No:** Uses the operating mode specified in the “Manual Configuration” column. When connecting the mGuard industrial RS or EAGLE mGuard to a hub, please note the following: When *Automatic Configuration* is deactivated, the Auto MDIX function is also deactivated. This means that the mGuard industrial RS or EAGLE mGuard port must either be connected to the uplink port of the hub or connected using a cross-link cable.
	Manual Configuration	The desired operating mode when *Automatic Configuration* is set to *No*.
	Current Mode	Current network connection mode.
	Port On	**Yes / No (only *mGuard industrial RS*, *EAGLE mGuard* and *mGuard smart*)** Enables / disables the Ethernet port.

6.4.1.3 Dial-out

Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*



Network >> Interfaces >> Dial-out

PPP dial-out options

Only configured if the mGuard should make a data connection (dial-out) to the WAN (Internet):

– Over the primary external interface (*Modem* or *Built-in Modem* network mode)

– Over the secondary external interface (also available in the *Stealth* or *Router* network mode)

Phone number to call

Telephone number of the ISP. The connection to the Internet is established after telephone connection is made.

Command syntax:

Together with the preset modem command for dialing ATD, the following dial sequence is created for the connected modem, for example: ATD765432.

A compatible pulse dialing procedure that works correctly in all cases is used as standard.

Special dial characters can be used in the dial sequence.

Network >> Interfaces >> Dial-out (continued)

HAYES special dial characters

– **`W`:** Instructs the modem to make a pause in dialing until the dial tone can be heard.

  Used when the modem is connected to a private branch exchange. An external line must be obtained first for outgoing calls by dialing a certain number (e.g. `0`) before the desired telephone number can be dialed.

  Example: ATD0W765432

– **T:** Change to tone dialing

  Set the special dial character T before the dialed number if the faster tone dialing procedure should be used (only with tone-compatible telephone connections). Example: ATDT765432.

Authentication

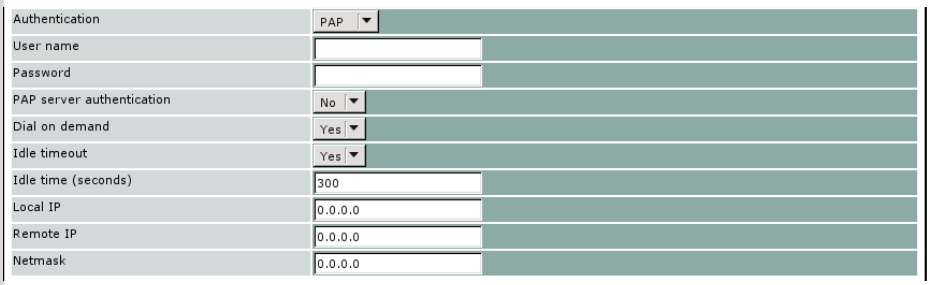
PAP / CHAP / None

PAP = Password Authentication Protocol, CHAP = Challenge Handshake Authentication Protocol. These are procedures used for the secure transfer of authentication data over Point-to-Point Protocol.

If the ISP requires the user to login using user name and password, then PAP or CHAP is used as the authentication procedure. The user name, password and any other entries needed for the user to access the Internet are given to the user by the ISP.

The relevant fields are displayed depending on whether **PAP**, **CHAP** or **None** is selected. Enter the relevant data in these fields.

If authentication is made via PAP:



User name

User name entered during ISP login to access the Internet.

Password

Password entered during ISP login to access the Internet.

PAP server authentication

Yes / No

The following two fields appear when **Yes** is selected:

Server user name

Server password

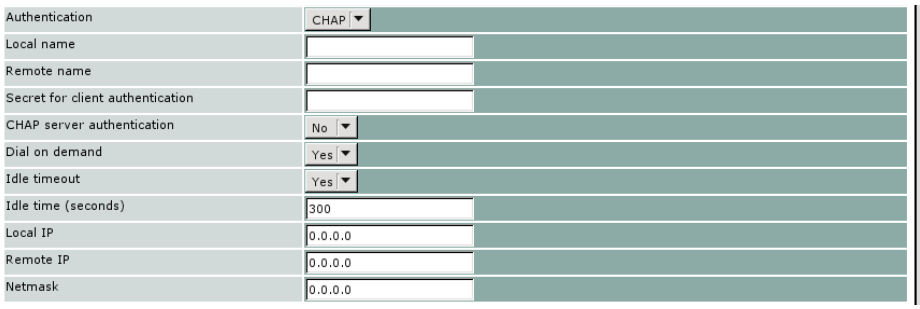
User name and password that the mGuard queries from the server. mGuard only allows the connection when the server provides the agreed user name and password combination.

Subsequent fields

See under “If “None” is selected as authentication” on page 6-83.

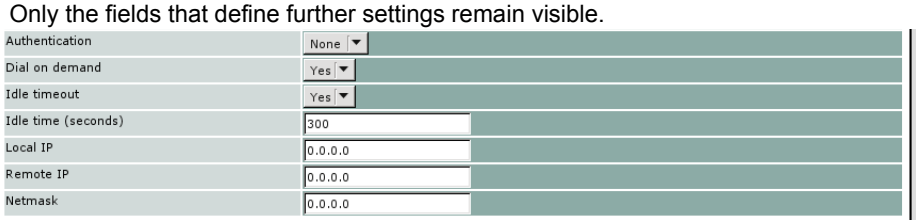
Network >> Interfaces >> Dial-out (continued)

If authentication is made via CHAP:



Local name	A name used by the mGuard at the ISP. The service provider may have several customers. This name allows the ISP to identify who is dialing. After the mGuard has logged in to the ISP with this name, the service provider also checks the password for client authentication (see below). The connection can only be made successfully when the name is known to the ISP and the password matches.
Remote name	A name given by the ISP to the mGuard for identification purposes. The mGuard will not connect to the service provider if the ISP does not give the correct name.
Secret for client authentication	Password entered during ISP login to access the Internet.
CHAP server authentication:	**Yes / No** The following two fields appear when **Yes** is selected:
Password for server authentication	The password that the mGuard queries from the server. mGuard only allows the connection when the server provides the agreed password.
Subsequent fields	See under “If “None” is selected as authentication” on page 6-83.
If “None” is selected as authentication	In this case all fields that relate to PAP or CHAP are hidden.

Only the fields that define further settings remain visible.



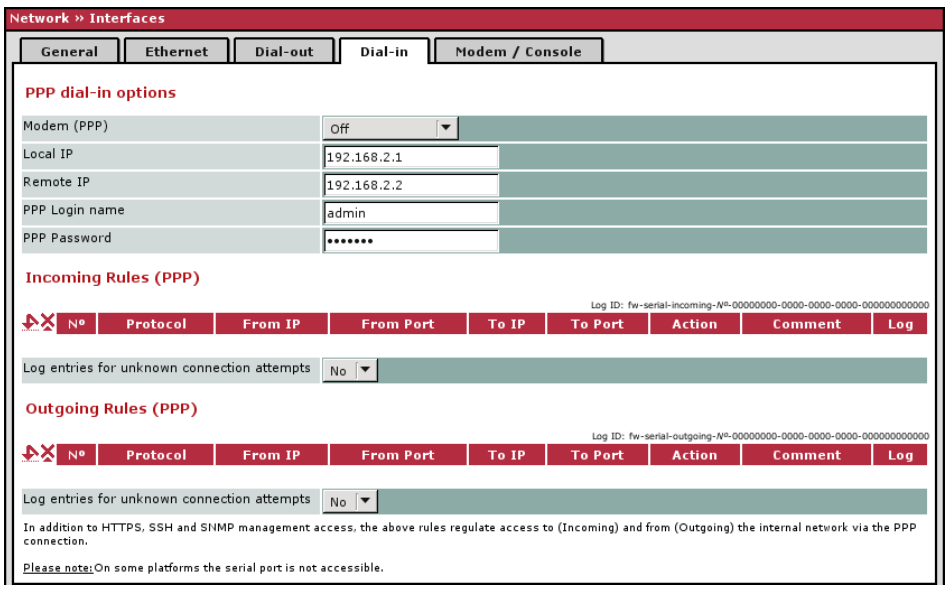
Other shared settings

Network >> Interfaces >> Dial-out		
PPP options (dial-out)	**Dial on demand**	Yes / No For both *Yes* and *No*: The telephone connection is always made by the mGuard. **Yes** (default): This setting is useful for telephone connections where costs are calculated according to connection length. The mGuard only commands the modem to establish a telephone connection when network packets are to be transferred. It also instructs the modem to terminate the telephone connection as soon as no more network packets are to be transferred for a specific time (see value in *Idle timeout*). By doing this, the mGuard is not constantly available externally (i.e. for incoming data packets). The mGuard also often or sporadically makes a connection via the modem, or keeps a connection longer, if the following conditions apply: – Often: The mGuard is configured so that it synchronizes its system time (date and time) regularly with an external NTP server. – Sporadically: The mGuard is acting as a DNS server and has to perform a DNS query for a client. – After a reboot: An active VPN connection is set to **initiate**. If this is the case, the mGuard sets up a connection after every reboot. – After a reboot: For an active VPN connection, the gateway of the remote peer is entered as a hostname. After a restart, the mGuard has to request the IP address belonging to the hostname from a DNS server. – Often: VPN connections are set up and DPD messages are sent regularly (see “Dead Peer Detection” on page 6-186). – Often: The mGuard is configured to send its external IP address regularly to a DNS service, e.g. DynDNS, in order to remain accessible over its hostname. – Often: The IP addresses of remote peer VPN gateways must be requested from the DynDNS service, or they must be kept up to date through new queries. – Sporadically: The mGuard is configured so that SNMP traps are sent to the remote server. – Sporadically: The mGuard is configured to permit and accept remote access via HTTPS, SSH or SNMP. (The mGuard then sends reply packets to every IP address from which an access attempt is made (if the firewall rules permit this access)). – Often: The mGuard is configured to make contact with a HTTPS server at regular intervals in order to download any configuration profile available there (see “Management >> Central Management” on page 6-47).

Network >> Interfaces >> Dial-out (continued)		
		When **No** is selected, the mGuard establishes a telephone connection using a connected modem as soon as possible after a reboot or activation of the *Modem* network mode. This remains permanently in place, regardless of whether data is transferred or not. If the telephone connection is then interrupted, the mGuard attempts to restore it immediately. Thus, a permanent connection is made (like a dedicated line). By doing this, the mGuard is constantly available externally (i.e. for incoming data packets).
	Idle timeout	**Yes / No** Only considered when *Dial on demand* is set to **Yes**. When **Yes** (default) is set, the mGuard terminates the telephone connection as soon as no data transfer takes place over the defined *Idle time*. The mGuard gives the connected modem the relevant command for terminating the telephone connection. When **No** is set, the mGuard gives the connected modem no command for terminating the telephone connection.
	Idle time (seconds)	Default: 300. If no data traffic is made after the time specified here, the mGuard can terminate the telephone connection (see above under *Idle timeout*).
	Local IP	IP address of the mGuard serial port that now acts as a WAN interface. Adopt the preset value if this IP address is assigned dynamically by the ISP: 0.0.0.0. Otherwise, enter this here (i.e. assignment of a fixed IP address).
	Remote IP	IP address of the remote peer. This is the IP address of the ISP used for access when connecting to the Internet. As PPP is used for the connection, the IP address is not normally specified. This means you can use the predefined value: 0.0.0.0.
	Netmask	The netmask here belongs to both *Local* and *Remote* IP addresses. Normally, all three values (*Local IP, Remote IP and Netmask*) are set or remain set to 0.0.0.0. Enter the connection settings for an external modem on the *Modem / Console* tab page (see “Modem / Console” on page 6-89).

6.4.1.4 Dial-in

Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*



Network >> Interfaces >> Dial-in

PPP dial-in options

Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*

Only configured if the mGuard is to permit PPP dial-in over:

– A modem connected to the serial port
– A built-in modem (option available for the mGuard industrial RS)

The PPP dial-in can be used to access the LAN (or the mGuard for configuration purposes) (see “Modem / Console” on page 6-89).

If the modem is used for dialing out by functioning as the primary external interface (*Modem* network mode) of the mGuard or as its secondary external interface (when activated in the *Stealth* or *Router* network mode), then it is not available for the PPP dial-in option.

Modem (PPP)

Only *mGuard industrial RS* (without a built-in modem or ISDN TA), *mGuard blade, EAGLE mGuard, mGuard delta*

Off / On

The setting **must** be “Off” if no serial port should be used for the PPP dial-in option.

If it is set to **On**, the PPP dial-in option is available. The connection settings for the connected external modem are made on the *Modem / Console* tab page.

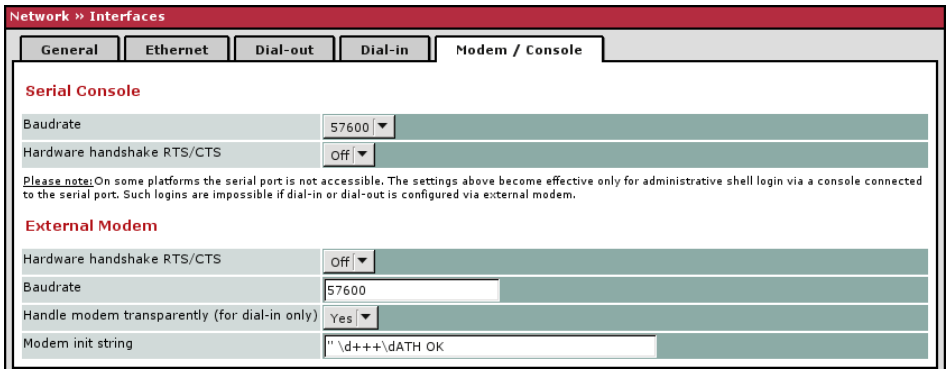
Network >> Interfaces >> Dial-in (continued)		
	Modem (PPP)	Only *mGuard industrial RS* (with built-in modem or ISDN TA) **Off / Built-in Modem / External Modem** The setting **must** be **Off** if the serial port should not be used for the PPP dial-in option. If it is set to **External Modem**, the PPP dial-in option is available. Then an external modem must be connected to the serial port. The connection settings for the connected external modem are made on the *Modem / Console* tab page. If this is set to **Built-in Modem**, the PPP dial-in option is available. In this case, the modem connection is not made over the *Serial* socket on the front side. Instead, it is made over the terminal block on the bottom where the built-in modem or ISDN terminal adapter is connected to the telephone network. The connection settings for the built-in modem are made on the *Modem / Console* tab page. If you are using the **Built-in Modem** option, you can also use the serial port. For the usage options, see “Modem / Console” on page 6-89.
	Local IP	IP address of the mGuard at which it can be accessed for a PPP connection.
	Remote IP	IP address of the PPP connection remote peer.
	PPP Login name	Login name that the PPP remote peer has to enter to gain access to the mGuard using PPP.
	PPP Password	Password that the PPP remote peer has to enter to gain access to the mGuard using PPP.
Incoming Rules (PPP)	Firewall rules for PPP connections to the LAN interface. If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored. You have the following options:	
	Protocol	**All** means: TCP, UDP, ICMP and other IP protocols.
	From / To IP	**0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).
	From / To Port	(Only evaluated for TCP and UDP protocols) **any** describes any selected port. **startport:endport** (e.g. 110:120) defines a range of ports. You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Network >> Interfaces >> Dial-in (continued)		
	Action	**Accept** means that data packets may pass through. **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.
	Comment	Freely selectable comment for this rule.
	Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)
	Log entries for unknown connection attempts	Yes / No When set to **Yes**, all attempts to establish a connection that are not covered by the rules defined above are logged.
	Outgoing Rules (PPP)	Firewall rules for outgoing PPP connections from the LAN interface. The parameters correspond to those of the *Incoming Rules (PPP)*. These outgoing rules apply to data packets that are sent out over a data connection initiated by PPP dial-in.

6.4.1.5 Modem / Console

Only for *mGuard centerport*, *mGuard industrial RS*, *mGuard blade, EAGLE mGuard, mGuard delta*

Some mGuard models have a serial port with external access, while the mGuard industrial RS is also optionally equipped with a built-in modem (see “Network >> Interfaces” on page 6-55).



Options for using the serial port

Alternatively, the serial port can be used as follows:

Primary External Interface

As a **primary external interface**, if the network mode is set to *Modem* under *Network >> Interfaces* on the *General* tab page (see “Network >> Interfaces” on page 6-55 and “General” on page 6-56).
In this case, the data traffic is not made over the WAN port (= Ethernet port) but over the serial port.

Secondary External Interface

As a **secondary external interface**, if the *Secondary External Interface* is activated and *Modem* is selected under *Network >> Interfaces* on the *General* tab page (see “Network >> Interfaces” on page 6-55 and “General” on page 6-56).
In this case, permanent or temporary data traffic is made over the serial port.

For dialing in to the LAN or for configuration purposes

Used for **dialing in to the LAN or for configuration purposes** (see also “Dial-in” on page 6-86). The following options are available:

– A modem is connected to the serial port of the mGuard. This modem is connected to the telephone network (landline or GSM network).

  (Connection to the telephone network is made over the terminal block on the bottom of the device for the mGuard industrial RS **with** built-in modem or ISDN terminal adapter.)

  This enables a remote PC that is also connected to the telephone network to establish a PPP (Point-to-Point Protocol) dial-up connection to the mGuard via a modem or ISDN adapter.

  This procedure is defined as a PPP dial-in option. It can be used to access the LAN behind the mGuard or to configure the mGuard. *Dial-in* is the interface definition used for this connection type in firewall selection lists.

  For you to be able to access the LAN with a Windows computer using the dial connection, a network connection must be set up on this computer in which the dial connection to the mGuard is defined. Additionally, the IP address of the mGuard (or its hostname) must be defined as a gateway for this connection so that the

connections to the LAN can be routed over this.
To access the web configuration interface of the mGuard, you must enter the IP address of the mGuard (or its hostname) in the address line of the web browser.

– The serial port of the mGuard is connected to the serial port of a PC.
The connection to the mGuard is established on a PC using a terminal program and the configuration is made using the command line interface of the mGuard.

If an external modem is connected to the serial port, you may have to enter corresponding settings below under *External Modem*, regardless of what you are using the serial port and the modem connected to it for.

Network >> Interfaces >> Modem / Console

Serial Console

The following settings for the *Baudrate* and *Hardware handshake* are only valid for configurations where a terminal or PC with a terminal program is connected to the serial port.

The settings are not valid when an external modem is connected. Settings for this are made further down under *External Modem*.

	Baudrate	The transfer speed of the serial port is defined over the selection list.
	Hardware handshake RTS / CTS	**Off / On** When set to **On**, flow control through RTS and CTS signals is used.
External Modem	**Hardware handshake RTS / CTS**	**Off / On** When set to **On**, flow control through RTS and CTS signals is used during PPP connection.
	Baudrate	Default: 57600. Transfer speed for communication between mGuard and modem over the serial cable connection. This should be set to the highest level supported by the modem. If the value is set lower than the maximum possible for the modem, the telephone connection will not work optimally.
	Handle modem transparently (for dial-in only):	**Yes / No** If the external modem is used for dialing in (see page 6-86), then a **Yes** setting means that the mGuard does not initialize the modem. The subsequently configured modem initialization sequence is not considered. Thus, either a modem is connected which can answer calls itself (default profile of the modem contains “auto answer”), or a null-modem cable to a computer can be used instead of the modem, and the PPP protocol is used over this.
	Modem init string	The initialization sequence that is sent by the mGuard to the connected modem. Default: `'' \d+++\dATH OK` If necessary, consult the modem manual for the initialization sequence.

Network >> Interfaces >> Modem / Console	
	The initialization sequence is a sequence of character strings expected by the modem, and commands that are then sent to the modem so that the modem can establish a connection.

The preset initialization sequence has the following meaning:

'' (two simple quotation marks placed directly after one another)	The empty character string inside the quotation marks means that the mGuard does not initially expect any information from the connected modem, but rather sends the following text directly to the modem.
\d+++\dATH	The mGuard sends this character string to the modem in order to establish the readiness of the modem for accepting commands.
OK	Specifies that the mGuard expects the **OK** character string from the modem as an answer to **\d+++\dATH**.

With many modem types it is possible to save modem settings in the modem itself. However, this option should not be used.

Initialization settings should be set externally instead (i.e. through the mGuard). In case of a modem breakdown, the modem can then be replaced quickly without changing the modem settings.

If the external modem is to be used for dial-ins, without the modem settings being entered accordingly, then you have to inform the modem that it should accept incoming calls after it rings.

If you are using the extended HAYES instruction set, you add the character string " **AT&S0=1 OK**" (a space followed by "**AT&S0=1**", followed by a space, followed by "**OK**") to the initialization sequence.

Some external modems, depending on their factory defaults, require a physical connection with the DTR cable of the serial port in order to operate correctly.

Because the mGuard models do not provide this cable on the external serial port, you must add the character string " **AT&D0 OK**" (a space followed by "**AT&D0**", followed by a space, followed by "**OK**") to the above initialization sequence. In accordance with the extended HAYES instruction set, this sequence means that the modem does not use the DTR cable.

If the external modem is to be used for dial-outs, it is connected to a private branch exchange, and if this private branch exchange does not generate a dial tone after the connection is opened, then the modem must be instructed not to wait for a dial tone before dialing.

In this case, please add the character string " **ATX3 OK**" (a space followed by "**ATX3**", followed by a space, followed by "**OK**") to the initialization sequence.

In this case, the control character "**W**" should be added to the *Phone number to call* after the digit for an outside line in order to wait for a dial tone.

On mGuard industrial RS with built-in modem / built-in ISDN modem (ISDN terminal adapter)

The mGuard industrial RS can additionally have an optional built-in analog modem or ISDN terminal adapter. The built-in modem or built-in ISDN terminal adapter can be used as follows:

Primary External Interface

– As a **primary external interface**, if the network mode is set to *Built-in Modem* under *Network* >> *Interfaces* on the *General* tab page (see “Network >> Interfaces” on page 6-55 and “General” on page 6-56). In this case, the data traffic is not made over the WAN port (= Ethernet port) but over this modem.

Secondary External Interface

– As a **secondary external interface**, if the *Secondary External Interface* is activated and *Built-in Modem* is selected under *Network* >> *Interfaces* on the *General* tab page (see “Network >> Interfaces” on page 6-55 and “General” on page 6-56). In this case the data traffic is also made over the serial port.

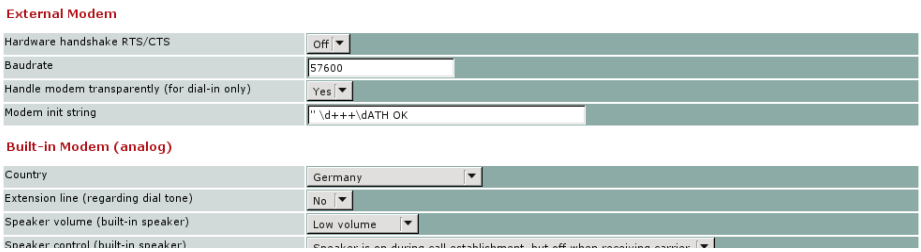
PPP dial-in options

– For the PPP dial-in option (see “Options for using the serial port” on page 6-89)

Note that the serial port of the device also provides similar usage options (see above). Thus, with the *mGuard industrial RS* with a built-in modem, the normal data traffic can be made over a modem connection (*Modem* network mode) and simultaneously a second modem connection can be used for the PPP dial-in option, for example.

For mGuard industrial RS with built-in modem

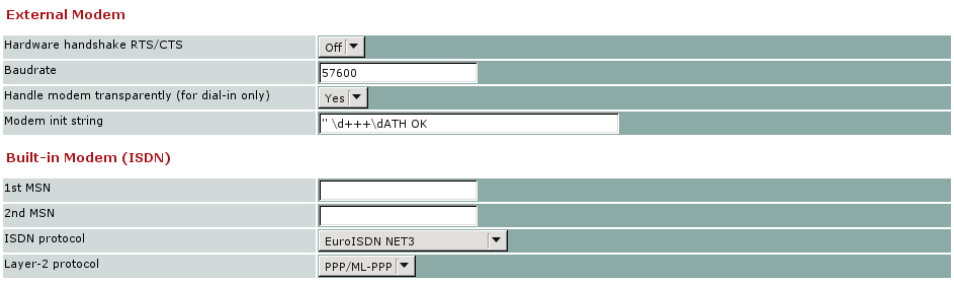
Additionally for mGuard industrial RS with built-in modem (analog)



Network >> Interfaces >> Modem / Console (for mGuard industrial RS with built-in modem)		
External Modem	**As for *mGuard industrial RS* (without a built-in modem), mGuard centerport, *mGuard blade, EAGLE mGuard* and *mGuard delta:***	
	Configuration as above for **External Modem** (see “External Modem” on page 6-90).	
Built-in Modem (analog)	**Country**	The country where the mGuard with built-in modem is operated must be entered here. This ensures that the built-in modem works according to the valid remote access guidelines in the respective country and that it recognizes and uses dial tones correctly, for example.
	Extension line (regarding dial tone)	Yes / No When **No** is selected, the mGuard waits for the dial tone when the telephone network is accessed and the mGuard is calling the remote peer. When **Yes** is selected, the mGuard does not wait for a dial tone. Instead, it begins dialing the remote peer immediately. This procedure may be necessary when the installed mGuard modem is connected to a private extension that does not emit a dial tone when it is “picked up”. When a specific number must be dialed to access an external line (e.g. “0”), then this should be added to the beginning of the telephone number.
	Speaker volume (built-in speaker)	
	Speaker control (built-in speaker)	These settings define which sounds are emitted by the mGuard speakers, and at which volume.

For mGuard industrial RS with built-in ISDN terminal adapter

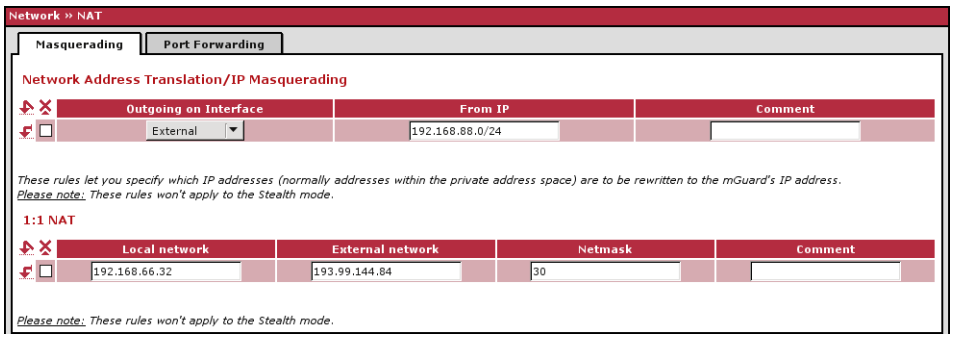
Additionally for mGuard industrial RS with built-in modem (ISDN)



Network >> Interfaces >> Modem / Console (for mGuard industrial RS with ISDN terminal adapter)		
External Modem	**As for *mGuard industrial RS* (without a built-in modem), mGuard centerport, *mGuard blade, EAGLE mGuard* and *mGuard delta:***	
	Configuration as above for **External Modem** (see “External Modem” on page 6-90).	
Built-in Modem (ISDN)	**1st MSN**	For outgoing calls, the mGuard transmits the entered MSN (Multiple Subscriber Number) to the called remote peer. The mGuard can also receive incoming calls over this MSN (provided dial-in is enabled – see *General* tab page). Max. 25 letters/numbers; the following special characters can be used: *****, **#**, **:** (colon)
	2nd MSN	If the mGuard can also receive incoming calls under another number, then enter the second MSN here.
	ISDN protocol	The EuroISDN (also known as NET3) ISDN protocol is used in Germany and many other European countries. Otherwise the ISDN protocol is specified according to the country. If necessary, this must be requested from the relevant telephone company.
	Layer-2 protocol	This is the control equipment over which the local mGuard ISDN terminal adapter communicates with the ISDN remote peer. This is generally the ISDN modem of the ISP used to create an Internet connection. This must be requested from the ISP. PPP/ML-PPP is used very often.

6.4.2 Network >> NAT

6.4.2.1 Masquerading



Network >> NAT >> Masquerading

Network Address Translation / IP Masquerading

Lists the rules set for NAT (**N**etwork **A**ddress **T**ranslation).

For outgoing data packets, the device can rewrite the sender IP addresses they contain from its internal network to its own external address. This technique is called NAT (Network Address Translation) – see also NAT (Network Address Translation) in the glossary.

This method is used whenever the internal address cannot or should not be routed externally (e.g. when a private address such as 192.168.x.x or the internal network structure should remain hidden).

This method is also known as *IP Masquerading*.

Factory default: NAT is not active.

If the mGuard is operated in *PPPoE/PPTP* mode, NAT must be activated in order to gain access to the Internet. If NAT is not activated, only VPN connections can be used.

If more than one static IP address for the WAN port is used, the first IP address of the list is always used for IP Masquerading.

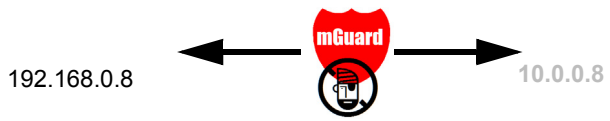
These rules do not apply to Stealth mode.

Outgoing on Interface — External / External 2 / Any External[1]

Specifies over which interface the data packets go out so that the rule applies to them. **Any External** refers to the **External** and **External 2** interfaces.

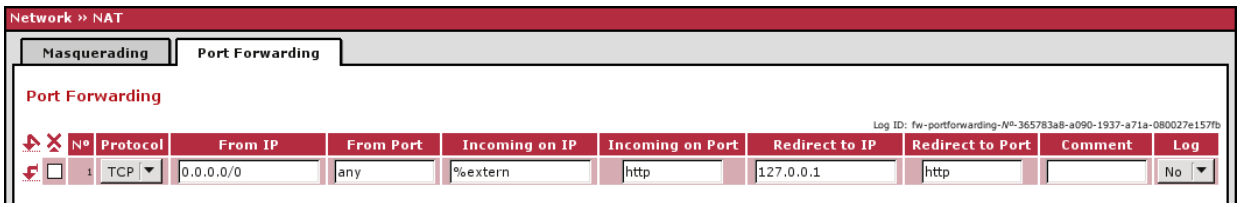
From IP — **0.0.0.0/0** means that all internal IP addresses are subject to the NAT procedure. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

Comment — Can be filled with relevant comments.

Network >> NAT >> Masquerading	
1:1 NAT	**Lists the rules set for 1:1 NAT (Network Address Translation).** With 1:1 NAT, the sender IP addresses are exchanged so that every individual address is exchanged with a specific other address, and not exchanged with the same address for all data packets, as in IP masquerading. This enables the mGuard to mirror the addresses from the internal network to the external network. Example: **The mGuard is connected to network 192.168.0.0/24 using the LAN port and to network 10.0.0.0/24 using the WAN port. By using 1:1 NAT, the LAN computer with the IP 192.168.0.8 can be reached under the IP 10.0.0.8 in the external network.**  **192.168.0.0/24** **10.0.0.0/24** **Factory default: 1:1 NAT is not active.** 1:1 NAT cannot be used on the *External 2* interface. 1:1 NAT is only used in the *Router* network mode. **Local network** The network address on the LAN port. **External network** The network address on the WAN port. **Netmask** The netmask as a value between 1 and 32 for the local and external network addresses (see also “CIDR (Classless Inter-Domain Routing)” on page 6-213). **Comment** Can be filled with relevant comments.

1 *External 2* and *Any External* are only for devices with serial ports: mGuard centerport, mGuard industrial RS, mGuard blade, EAGLE mGuard, mGuard delta (see “Secondary External Interface” on page 6-66).

6.4.2.2 Port Forwarding



Network >> NAT >> Port Forwarding

Port Forwarding

Lists the rules set for port forwarding (DNAT = Destination NAT).

Port forwarding performs the following: The headers of incoming data packets from the external network, which are addressed to the mGuard's external IP address (or one of its external IP addresses) and to one of the ports on the mGuard, are rewritten in order to forward them to a specific port on a specific computer. In other words, both the IP address and the port number (in the header of the incoming data packets) are changed.

This method is also known as Destination NAT.

Port forwarding cannot be used for connections initiated over the *External 2*[1] interface.

1 *External 2* is only for devices with serial ports.

The rules set here have priority over the settings made under Network Security >> Packet Filter >> Incoming Rules.

Protocol: TCP / UDP — Enter the protocol which the rule should relate to.

From IP — The source address where forwarding is made.

0.0.0.0/0 means all addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

From Port — The source port where forwarding is made.

any describes any selected port.

Either the port number or the corresponding service name can be entered here (e.g. *pop3* for port 110 or *http* for port 80).

Incoming on IP

– Enter the external IP address (or one of the external IP addresses) of the mGuard here, **or**
– use variable: **%extern** (when a dynamic change of the external IP address of the mGuard is made so that the external IP address cannot be entered).

  If more than one static IP address is used for the WAN port, the variable **%extern** always corresponds to the first IP address of the address list.

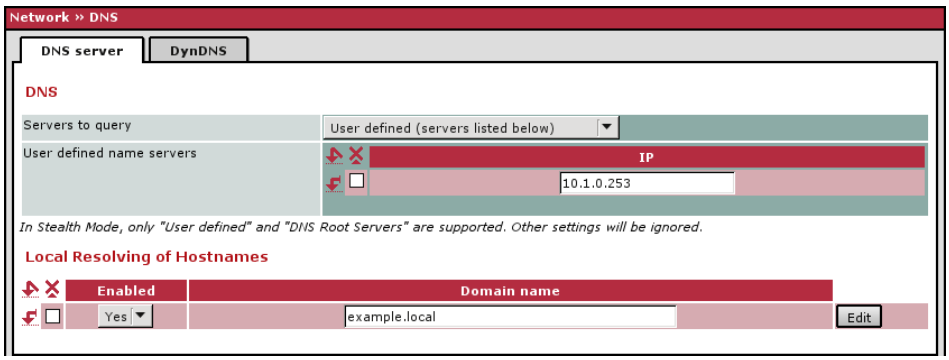
Incoming on Port — The original destination port set in the incoming data packets.

Either the port number or the corresponding service name can be entered here (e.g. *pop3* for port 110 or *http* for port 80).

Network >> NAT >> Port Forwarding (continued)		
	Redirect to IP	The internal IP address to which the data packets should be forwarded. The original destination address is overwritten with this address.
	Redirect to Port	The port to which the data packets should be forwarded. The original destination port will be overwritten with this port. Either the port number or the corresponding service name can be entered here (e.g. *pop3* for port 110 or *http* for port 80).
	Comment	Freely selectable comment for this rule.
	Log	For each individual port forwarding rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)

6.4.3 Network >> DNS

6.4.3.1 DNS server



Network >> DNS >> DNS server	
DNS	If the mGuard has to initiate a connection on its own to a remote peer (e.g. a VPN gateway or NTP server) and it is defined in hostname form (i.e. www.example.com), the mGuard has to determine which IP address belongs to the hostname. To do this, the mGuard connects to a Domain Name Server (DNS) to query the related IP address there. The IP address determined for the hostname is stored in the cache so that it can be found directly (i.e. more quickly) for other hostname resolutions. With the *Local Resolving of Hostnames* function, the mGuard can also be configured to respond to DNS queries for locally used hostnames itself by accessing an internal, previously configured directory. **The locally connected clients can be configured (manually or via DHCP) so that the local address of the mGuard is used as the address of the DNS server to be used. If the mGuard is operated in *Stealth* mode, the management IP address of the mGuard (if this is configured) must be used for the clients or the IP address 1.1.1.1 must be entered as the local address of the mGuard.**
Servers to query	– **DNS Root Servers** Queries are sent to the root servers in the Internet whose IP addresses are stored in the mGuard. These addresses rarely change. – **Provider defined (e.g. via PPPoE or DHCP)** The domain name servers of the Internet Service Provider that provide access to the Internet are used. Only select this setting if the mGuard is operated in *PPPoE*, *PPTP*, *Modem* mode, or in *Router* mode with DHCP. – **User defined (servers listed below)** If this setting is selected, the mGuard will connect to the domain name servers shown in the list of *User defined name servers*.
User defined name servers	You can enter the IP addresses of domain name servers in this list. If these should be used by the mGuard, select the option *User defined (servers listed below)* under **Servers to query**.

Network >> DNS >> DNS server (continued)

Local Resolving of Hostnames

You can configure multiple entries with assignment pairs of hostnames and IP addresses for various domain names.

You have the option to define, change (edit) and delete assignment pairs of hostnames and IP addresses. You can also activate or deactivate the resolving of hostnames for a domain. And you can delete a domain with all its assignment pairs.

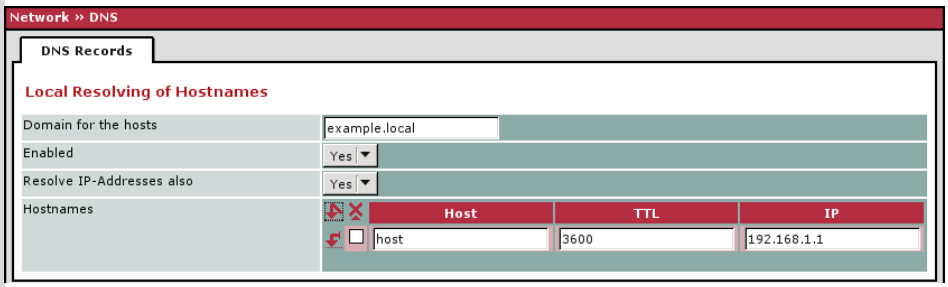
Create a table with assignment pairs for a domain:

- Open a new row and click on **Edit** in this row.

Change or delete assignment pairs belonging to a domain:

- Click on **Edit** in the relevant table row.

  After clicking on **Edit**, the *DNS Records* tab page is displayed:



Domain for the hosts	Any name can be entered, but it must adhere to the rules for assigning domain names. Is assigned to every hostname.
Enabled	**Yes / No** Switches the function *Local Resolving of Hostnames* on (**Yes**) or off (**No**) for the domain entered in the field above.
Resolve IP Addresses also	**No:** The mGuard only resolves hostnames, i. e. it supplies the IP address assigned to hostnames. **Yes:** Same as for No. It is also possible to get the hostname assigned to an IP address.
Hostnames	The table can have any number of entries. A hostname may be assigned to multiple IP addresses. Multiple hostnames may be assigned to one IP address.
TTL	Abbreviation of **T**ime **T**o **L**ive. Entry in seconds. Default: 3600 (= 1 hour) Defines how long assignment pairs called up may be stored in the cache of the calling computer.
IP	The IP address assigned to the hostname in this table row.
Delete domain with all assignment pairs	Delete the corresponding table entry.

Example: Local Resolving of Hostnames

The “Local Resolving of Hostnames” function is used in the following scenario, for example:

A plant operates a number of identically structured machines, each one as a cell. The local networks of cells A, B and C are each connected to the plant network via the Internet using mGuard. Each cell contains multiple control elements, which can be accessed via their IP addresses. Different address ranges are used for each cell.

A service technician should be able to use his notebook on site to connect to the local network for machine A, B or C and communicate with the individual controls. So that the technician does not have to know and enter the IP address for every single control in machine A, B or C, hostnames are assigned to the IP addresses of the controls in accordance with a standardized schema that the service technician uses. The hostnames used for machines A, B and C are identical, i.e. the control for the packing machine in all three machines has the host name “pack”, for example. However, every machine is assigned an individual domain name, e.g. cell-a.example.com.

The service technician can connect his notebook to the local network at machine A, B or C and use the same hostname in each of these networks to communicate with the corresponding machine controls.

The notebook can get the IP address to be used, the name server and the domain from the mGuard via DHCP.

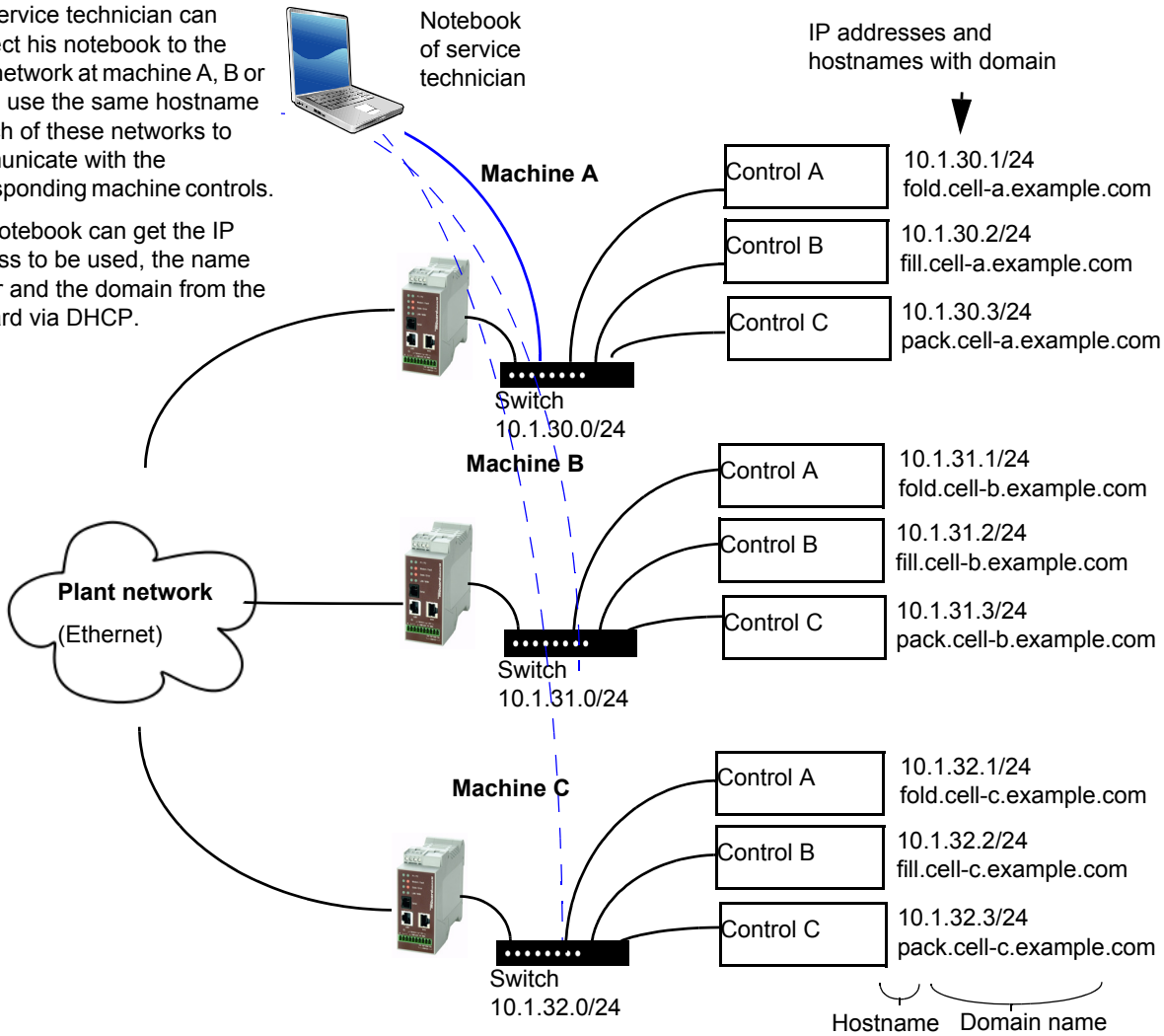
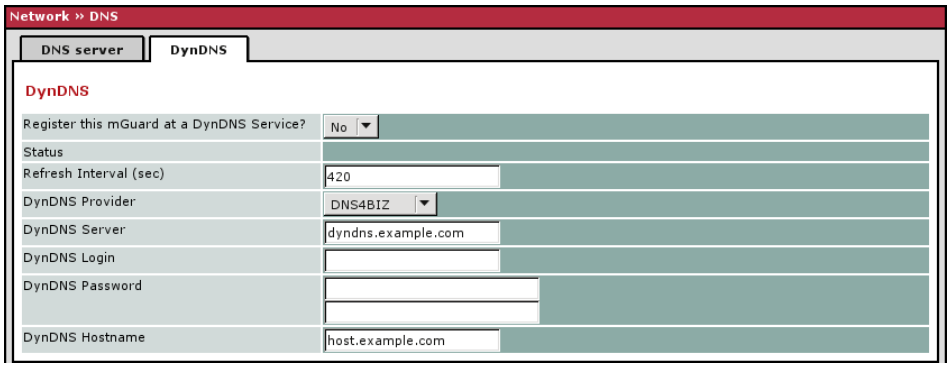


Fig. 6-2 Local Resolving of Hostnames

6.4.3.2 DynDNS



Network >> DNS >> DynDNS

DynDNS

At least one partner IP address must be known in order to establish a VPN connection so that they can connect to each other. This condition is not fulfilled if both participants are assigned IP addresses dynamically by their respective Internet Service Providers. In this case, a DynDNS service such as DynDNS.org or DNS4BIZ.com can be of assistance. The currently valid IP address is registered under a fixed name for a DynDNS service.

If you have registered with one of the DynDNS services supported by mGuard, you can enter the corresponding information in this dialog.

Register this mGuard at a DynDNS Service?

Select **Yes** if you have registered with a DynDNS provider and the mGuard should utilize this service. The mGuard reports its current IP address to the DynDNS service (i.e. the one assigned for Internet access by the Internet Service Provider).

Refresh Interval (sec)

Default: 420 (seconds).

The mGuard informs the DynDNS service of its new IP address whenever the IP address of its Internet connection is changed. For additional reliability, the device will also report its IP address at the interval set here.

This setting has no effect for some DynDNS providers like DynDNS.org, as too many updates can cause the account to be closed.

DynDNS Provider

The providers in this list support the same protocol as the mGuard.

Select the name of the provider where you are registered, e.g. DynDNS.org, TinyDynDNS, DNS4BIZ.

DynDNS Server

Name of the server for the selected DynDNS provider.

DynDNS Login, DynDNS Password

Enter the user name and password assigned by the DynDNS provider here.

DynDNS Hostname

The name selected for this mGuard at the DynDNS service, providing you use a DynDNS Service and have entered the corresponding data above.

The mGuard can then be accessed under this hostname.

6.4.4 Network >> DHCP

The Dynamic Host Configuration Protocol (DHCP) can be used to automatically assign the appropriate network configuration to the computer connected directly to the mGuard. Under *Internal DHCP*, you can configure the DHCP settings for the internal interface (= LAN port) and under *External DHCP* the DHCP settings for the external interface (= WAN port).

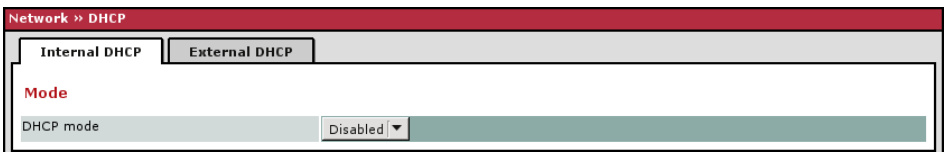
The DHCP server is also operational in *Stealth* mode.

IP configuration for Windows computers: When you start the mGuard DHCP server, you can configure the locally connected computers so that they obtain IP addresses automatically.

In Windows XP:

- Select “Control Panel, Network Connections” in the Start menu.
- Right-click on the LAN adapter icon, then click on **Properties** in the pop-up menu.
- In the “General” tab page, select “Internet Protocol (TCP/IP)” under “This connection uses the following items”, then click on “Properties”.
- Make the appropriate entries or settings in the “Internet Protocol Properties (TCP/IP)” dialog.

6.4.4.1 Internal / External DHCP

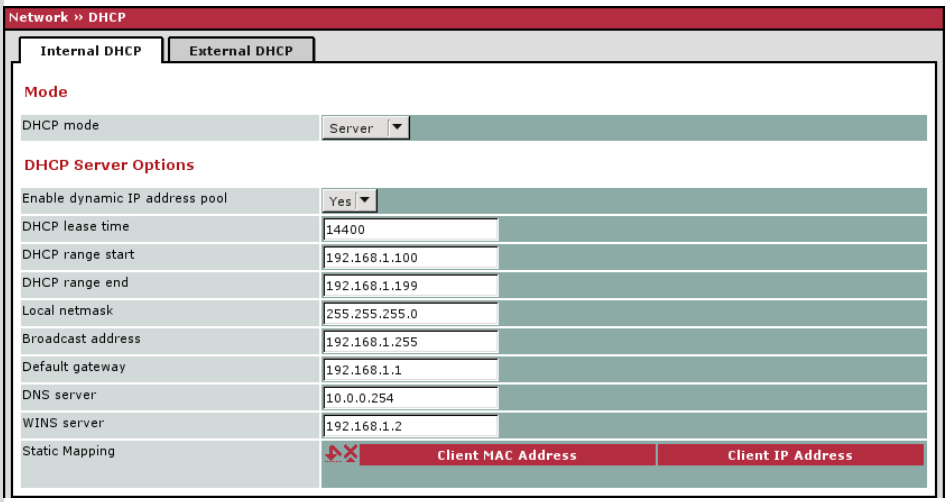


Network >> DHCP >> Internal DHCP		
Mode	**DHCP mode**	**Disabled / Server / Relay** Set this option to **Server** if the mGuard should function as an independent DHCP server. The selection settings are then displayed at the bottom of the tab page (see “Server”). Set the option to **Relay** if the mGuard should forward DHCP queries to another DHCP server. The selection settings are then displayed at the bottom of the tab page (see “Relay”). The *Relay* DHCP mode is not supported in *Stealth* mode. If *Stealth* mode is in operation on the mGuard and *Relay* DHCP mode is selected, then this setting is ignored. However, DHCP queries from the computer and the respective answers are forwarded due to the nature of Stealth mode. If this option is set to **Disabled**, the mGuard does not answer any DHCP queries.

Network >> DHCP >> Internal DHCP (continued)

DHCP mode **Server**

If the DHCP mode is set to *Server*, the following selection settings are displayed:



DHCP Server Options

Enable dynamic IP address pool

Select **Yes** if you wish to use the IP address pool defined by *DHCP range start* and *DHCP range end*.

Select **No** if only static assignments should be made according to the MAC addresses (see below).

With enabled dynamic IP address pool:

When the DHCP server and the dynamic IP address pool have been activated you can enter the network parameters to be used by the computer:

DHCP range start / end

The start and end of the address range from which the mGuard's DHCP server should assign IP addresses to locally connected computers.

DHCP lease time

Time in seconds for which the network configuration assigned to the computer is valid. The client should renew its configuration shortly before this time expires. Otherwise it may be assigned to other computers.

Local netmask

Defines the netmask of the computers. The factory default is: 255.255.255.0

Broadcast address

Defines the broadcast address of the computers.

Default gateway

Defines which IP address should be used by the computer as the default gateway. Usually this is the internal IP address of the mGuard.

DNS server

Address of the server used by computers to release hostnames in IP addresses over the domain name service (DNS).

If the DNS service of the mGuard is used, enter the internal IP address of the mGuard here.

Network >> DHCP >> Internal DHCP (continued)

WINS server

Address of the server used by computers to resolve hostnames to addresses over the Windows Internet Naming Service (WINS).

Static Mapping [according to MAC address]

Find out the **MAC address** of your computer as follows:

Windows 95/98/ME:

- Start **winipcfg** in a DOS box.

Windows NT/2000/XP:

- Start **ipconfig /all** in a prompt. The MAC address is shown as “Physical Address”.

Linux:

- Call up **/sbin/ifconfig** or **ip link show** in a shell.

You have the following options:

– The MAC address of the client/computer (without spaces or hyphens)

– Client IP address

Client IP address

The static IP of the computer to be assigned to the MAC address.

Static assignments take priority over the dynamic IP address pool.

Static assignments and dynamic IP pool addresses must not overlap.

Do not use one IP address in several static assignments, otherwise several MAC addresses are assigned to this IP address.

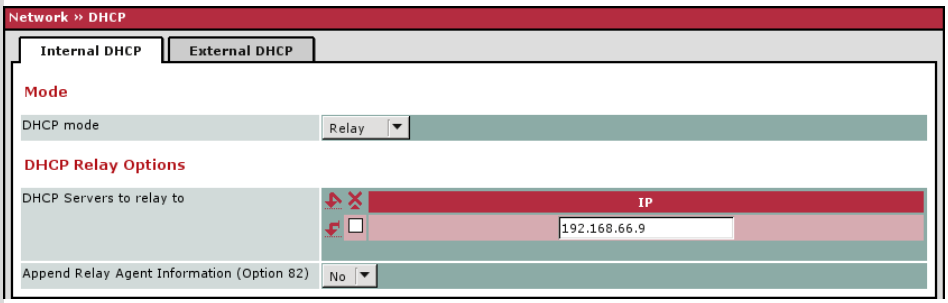
Only use one DHCP server per subnetwork.

Network >> DHCP >> Internal DHCP (continued)

DHCP Relay Options

DHCP mode **Relay**

If the DHCP mode is set to *Relay*, the following selection settings are displayed:

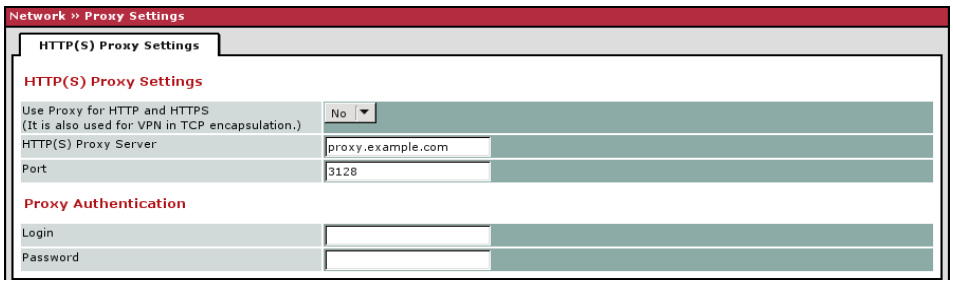


The *Relay* DHCP mode is not supported in *Stealth* mode. If *Stealth* mode is in operation on the mGuard and *Relay* DHCP mode is selected, then this setting is ignored. However, DHCP queries from the computer and the respective answers are forwarded due to the nature of Stealth mode.

DHCP Servers to relay to	A list of one or more DHCP servers where DHCP requests should be forwarded.
Append Relay Agent Information (Option 82)	During forwarding, additional information for the DHCP server where forwarding is made can be added according to RFC 3046.

6.4.5 Network >> Proxy Settings

6.4.5.1 HTTP(S) Proxy Settings



A proxy server can be entered for the following activities performed by the mGuard itself:

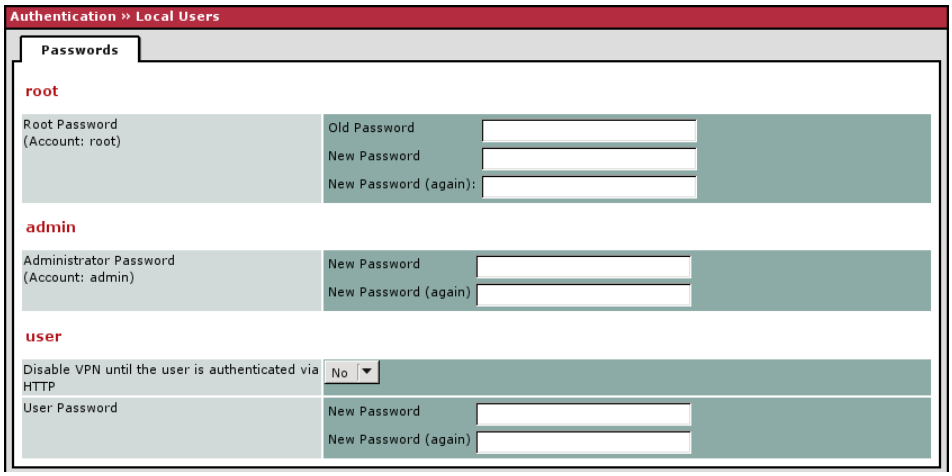
– CRL download
– Firmware update
– Regular configuration profile retrieval from central peer
– Restoring licenses

Network >> Proxy Settings >> HTTP(S) Proxy Settings		
HTTP(S) Proxy Settings	**Use Proxy for HTTP and HTTPS:**	When **Yes** is selected, connections using HTTP or HTTPS are transferred over a proxy server whose address and port are defined in the corresponding two fields.
	HTTP(S) Proxy Server	Hostname or IP address of the proxy server.
	Port	Port number to be used (e.g. 3128).
Proxy Authentication	**Login**	User name for proxy server registration.
	Password	Password for proxy server registration.

6.5 Authentication menu

6.5.1 Authentication >> Local Users

6.5.1.1 Passwords



Local users refers to users who have the right (depending on their authorization level), to configure the mGuard (*Root* and *Administrator* authorization levels) or to use it (*User* access permission).

Authentication >> Local Users >> Passwords		
	To login at a specific authorization level, the user must enter the corresponding password assigned to the level (root, admin or user).	
root	**Root Password (Account: root)**	Grants full rights to all parameters of the mGuard. Note: Only this authorization level allows unlimited access to the file system of the mGuard. Username (cannot be changed): **root** Default root password: **root** • To change the root password, enter the current password in the *Old Password* field, then the new password in the two corresponding fields directly underneath.
admin	**Administrator Password (Account: admin)**	Grants all rights required for the configuration options accessed via the web-based administrator interface. Username (cannot be changed): **admin** Default password: **mGuard**

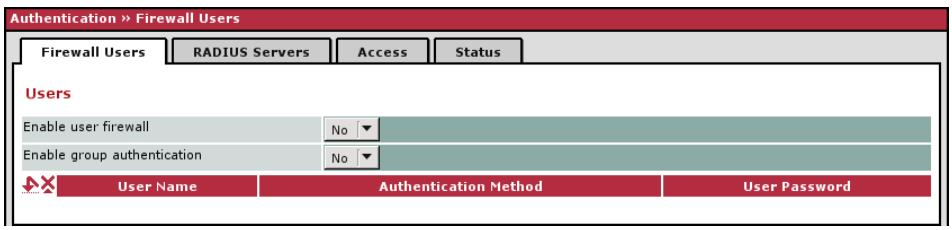
Authentication >> Local Users >> Passwords (continued)		
user	**Disable VPN until the user is authenticated via HTTP**	If a user password has been defined and activated, the user must enter this password to **enable configured VPN connections** when they first attempt to access any HTTP URL. This must be made after every restart of the mGuard. To use this option, enter the desired user password once in each of the corresponding entry fields. The factory default for this option is **No**. If **Yes** is selected, VPN connections can only be used after a user has logged into the mGuard via HTTP. As long as authentication is required, all HTTP traffic is redirected to the mGuard. Changes to this option only become active after the next reboot.
	User Password	There is no factory default for the user password. To set one, enter the desired password twice – once in each of the two entry fields.

6.5.2 Authentication >> Firewall Users

For example, to eliminate private surfing on the Internet, every outgoing connection is blocked under *Network Security* >> *Packet Filter* >> *Sets of Rules*. VPN is not affected by this.

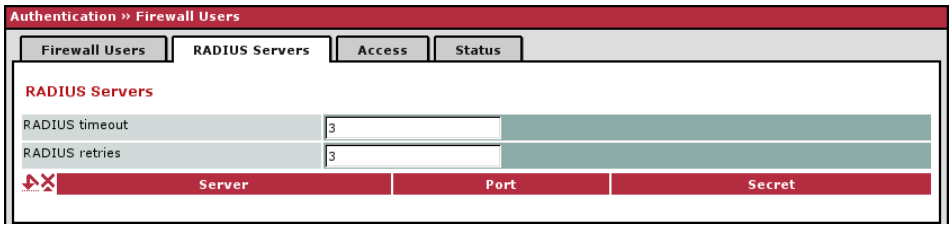
Under *Network Security* >> *User Firewall*, certain users can be assigned different firewall definitions (e.g. outgoing connections are permitted). This user firewall rule comes into effect as soon as the respective firewall user has logged in, see “Network Security >> User Firewall” on page 6-141.

6.5.2.1 Firewall Users



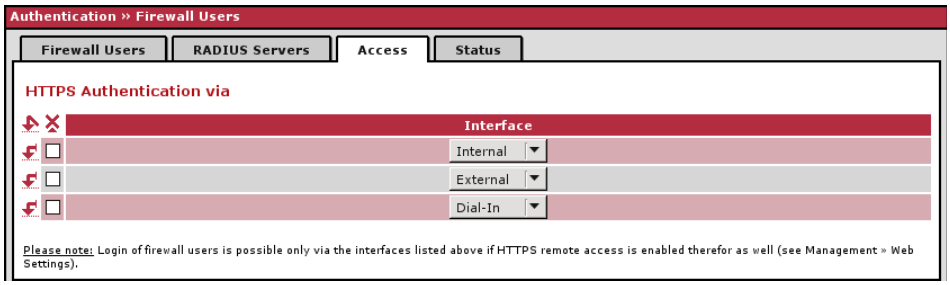
Authentication >> Firewall Users >> Firewall Users		
Users	**Lists the firewall users by their user names. Also defines the authentication methods.**	
	Enable user firewall	Under the *Network Security* >> *User Firewall* menu, firewall rules can be defined and assigned to specific firewall users. By selecting **Yes**, the firewall rules for the listed users are activated as soon as the corresponding user logs in.
	Enable group authentication	If enabled, the mGuard forwards login requests for unknown users to the RADIUS server. If successful, the reply from the RADIUS server will contain a group name. The mGuard then enables user firewall templates containing this group name as the template user. The RADIUS server must be configured to deliver this group name in the “Access Accept” package as a “Filter-ID=<groupname>” attribute.
	User Name	Required name of the user during login.
	Authentication Method	**Local DB:** When *Local DB* is selected, the password assigned to the user must be entered in the *User Password* column, next to the *User Name*. **RADIUS:** When RADIUS is selected, the user password can be stored on the RADIUS server.
	User Password	Only active when *Local DB* is selected as the authentication method.

6.5.2.2 RADIUS Servers



Authentication >> Firewall Users >> RADIUS Servers		
RADIUS Servers	**RADIUS timeout**	Specifies (in seconds) how long the mGuard waits for an answer from the RADIUS server. Default: 3 seconds.
	RADIUS retries	Specifies how often requests to the RADIUS server are retried after a RADIUS timeout has occurred. Default: 3.
	Server	Name of the RADIUS server or its IP address
	Port	The port number used by the RADIUS server
	Secret	RADIUS server password

6.5.2.3 Access


Authentication » Firewall Users
Firewall Users
RADIUS Servers
Access
Status
HTTPS Authentication via
Interface
Internal
External
Dial-In
Please note: Login of firewall users is possible only via the interfaces listed above if HTTPS remote access is enabled therefor as well (see Management » Web Settings).

Authentication >> Firewall Users >> Access

HTTPS Authentication via

ATTENTION: For authentication via an external interface, consider the following:

If a firewall user can logon via an “unsecure” interface and the user leaves without logging out correctly, then the logon remains in place and could be misused by another unauthorized person.

An interface is “unsecure”, for example, if a user logs on over the Internet from a location or a computer to which the IP address is assigned dynamically by the ISP – as normally happens for many Internet users. If such a connection is temporarily interrupted because the user logged on is being assigned a different IP address, this user must logon again.

However, the old logon made under the old IP address remains in place. This logon could then be used by an intruder, who uses this “old” IP address of the authorized user and accesses the mGuard using this source address. The same thing could also occur if an (authorized) firewall user forgets to logoff at the end of a session.

This hazard for logging on via an “unsecure” interface is not completely removed, but the time is limited by setting the configured timeout for the user firewall template used. See “Timeout type” on page 6-142.

Interface — **External / Internal / External 2 / Dial-in**[1]

Specifies which mGuard interfaces firewall users can use to log into the mGuard. For the interface selected, web access via HTTPS must be enabled: **Management** menu, **Web Settings**, *Access* tab page (see “Access” on page 6-19).

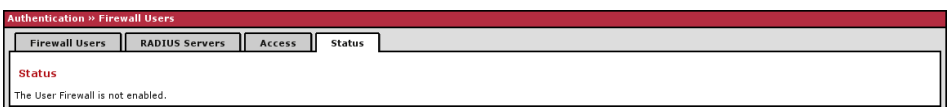
In the *Stealth* network mode, both the **Internal** and **External** interfaces must be released so that firewall users can logon to the mGuard.

(Two rows must be entered in the table for this.)

1 *External 2* and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

6.5.2.4 Status

If the user firewall is activated, its status is displayed here.



6.5.3 Authentication >> Certificates

Authentication is a fundamental element of secure communication. The X.509 authentication procedure ensures that the “correct” partners communicate with each other. Certificates are used in this process. An “incorrect” communication partner is one who falsely identifies themselves as someone they are not – see glossary under “X.509 Certificate”.

Certificate

A certificate is used as proof of authentication for its owner. The relevant authorizing party in this case is the CA (Certificate Authority). The digital signature on the certificate is made by the CA. By providing this signature, the CA confirms that the authorized certificate owner possesses a private key that corresponds to the public key in the certificate.

The name of the certificate provider is shown as *Issuer* on the certificate, whilst the name of the certificate owner is shown as *Subject*.

Self-signed certificates

A self-signed certificate is one that is signed by the certificate owner, and not by a CA. In self-signed certificates, the name of the certificate owner is shown as both *Issuer* and *Subject*.

Self-signed certificates are used when communication partners want to use the X.509 authentication procedure without having an official certificate. This type of authentication should only be used between partners that know and trust each other well. Otherwise, from a security point of view such certificates are as worthless as a home-made passport without the official stamp.

Certificates are shown to all communication partners (users or machines) during the connection process, providing the X.509 authentication method is used. In terms of mGuard, this could relate to the following applications:

– Authentication of communication partners during establishment of VPN connections (see “IPsec VPN >> Connections” on page 6-165, “Authentication” on page 6-177).
– mGuard management using SSH (shell access) (see “Management >> System Settings” on page 6-4, “Shell Access” on page 6-11).
– mGuard management using HTTPS (see “Management >> Web Settings” on page 6-18, “Access” on page 6-19).

Certificate, machine certificate

Certificates can be used to identify (authenticate) oneself to others. The certificate used by the mGuard to identify itself to others shall be known as the “machine certificate” here, in line with Microsoft Windows terminology.

A “certificate”, “certificate specific to an individual” or “user certificate displaying a person” is one used by operators to authenticate themselves to remote peers (e.g. for an operator attempting remote access to the mGuard using HTTPS and a web browser). When acquired by a web browser, a certificate specific to an individual can be saved on a chip card and then inserted into the card reader of the owner’s computer.

Remote certificate

A certificate is thus used by its owner (person or machine) as a form of ID in order to verify that they really are the individual they identify themselves as. As there are two communication partners, the process takes place alternately: Partner A shows their certificate to their remote peer (partner B). Partner B then shows their certificate to their remote peer (partner A).

In order for A to accept the certificate shown by B (thus allowing communication), there is the following option: A has earlier received a copy of the certificate from B (e.g. by data carrier or e-mail), with which B will identify itself. A can then verify the certificate shown later by B by comparing it to this certificate. When related to the mGuard interface, the certificate copy given here by B to A is an example of a *Remote certificate*.

For bilateral authentication to take place, both partners must thus give each other a copy of their certificate. A installs the copy of the certificate from B as its remote certificate. B then installs the copy of the certificate from A as its remote certificate.

Never give the PKCS#12 file (file name extension: *.p12) as a copy to the remote peer in order to use X.509 authentication at a later time! The PKCS#12 file contains a private key that must be kept secret and must not be given to a third party (see “Creation of certificates” on page 6-114).

To create a copy of a machine certificate imported in the mGuard, proceed as follows:

- Click the **Current Certificate File** button on the machine certificate tab page next to the row title *Download Certificate* (see “Machine Certificates” on page 6-120).

CA certificates

The certificate shown by a remote peer can also be checked by the mGuard in a different way (i.e. not by consulting the locally installed remote certificate on the mGuard). To check the authentication of remote peers using X.509, the method of consulting CA certificates can be used instead or as a supplement.

CA certificates provide a way of checking whether the certificate shown by the remote peer is really signed by the CA entered within.

A CA certificate is available from the related CA (file name extension: *.cer, *.pem or *.crt). It is often available to download from the website of the CA itself.

The mGuard can then check if the certificate shown by the remote peer is authentic using the CA certificates loaded in the mGuard. In this case, all CA certificates must be available in mGuard in order to build a chain with the certificate displayed by the remote peer. Aside from the CA certificate, whose signature can be seen in the displayed certificate of the remote peer to be checked, the CA certificate of the superordinate CA up to the root certificate must be used (see glossary under CA certificate).

Authentication using CA certificates allows an expansion in the number of possible remote peers without any increased management output, as the installation of a remote certificate for each possible remote peer is not compulsory.

Creation of certificates

For certificate creation, a *private key* and the corresponding *public key* are needed. Programs are provided where any user can create these keys. A certificate with the relevant *public key* can also be created, resulting in a self-signed certificate. Further documentation on self-creation can be downloaded from www.innominate.com. This can be found in the download area as an application note under the title “How to obtain X.509 certificates”.

A related certificate signed by a CA must be requested from the CA.

In order for the private key to be imported to the mGuard with the related certificate, these components must be packed into a PKCS#12 file (file name extension: *.p12).

Authentication procedure

The mGuard can use two principle procedures for X.509 authentication.

– The authentication of a remote peer is carried out based on the certificate and remote certificate. In this case, the consulted remote certificate must be given for each individual connection (e.g. for VPN connections).
– The mGuard consults the provided CA certificate to check whether the certificate shown by the remote peer is authentic. In this case, all CA certificates must be made available for the mGuard in order to build a chain up to the root certificate using the certificate displayed by the remote peer.

“Available” means that the corresponding CA certificates must be installed in the mGuard (see “CA Certificates” on page 6-122) and must be made available additionally during the configuration of the corresponding applications (SSH, HTTPS, VPN).

Whether both procedures are used alternatively or in combination varies on the application (VPN, SSH and HTTPS).

Authentication for SSH)

The remote peer shows the following:	Certificate (specific to individual) **signed by CA**	Certificate (specific to individual) **self-signed**
The mGuard authenticates the remote peer using:		
	All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer or ADDITIONALLY Remote certificates, **if** used as a filter[1]	Remote certificate

1 (See “Management >> System Settings” on page 6-4, “Shell Access” on page 6-11)

Authentication for HTTPS

The remote peer shows the following:	Certificate (specific to individual) **signed by CA**[1]	Certificate (specific to individual) **self-signed**
The mGuard authenticates the remote peer using:		
	All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer or ADDITIONALLY Remote certificates, **if** used as a filter[2]	Remote certificate

1 The remote peer can additionally provide sub-CA certificates. In this case the mGuard can form the set union for building the chain from the CA certificates provided and the self-configured CA certificates. The corresponding root CA certificate of the mGuard must always be available.

2 (See “Management >> Web Settings” on page 6-18, “Access” on page 6-19)

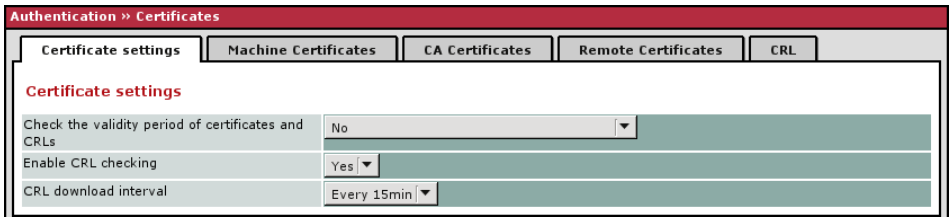
Authentication for VPN

The remote peer shows the following:	Machine certificate **signed by CA**	Machine certificate **self-signed**
The mGuard authenticates the remote peer using:		
	Remote certificate All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer	Remote certificate

ATTENTION: Installation of the certificate in the mGuard under *Authentication* >> *Certificates* is not sufficient. In addition, which mGuard certificate imported from the pool is used must be referenced in the relevant applications (VPN, SSH, HTTPS).

The remote certificate for authentication of a VPN connection (or VPN connection channels) is installed in the *IPsec VPN* >> *Connections* menu.

6.5.3.1 Certificate settings



Authentication >> Certificates >> Certificate settings

Certificate settings

The settings made here relate to all certificates and certificate chains checked by the mGuard.

The following are excepted:

– Self-signed certificates from remote peers

– All remote certificates for VPN

Check the validity period of certificates and CRLs: No / Wait for synchronization of the system time

No: The entered validity periods in certificates and CRLs are ignored by the mGuard.

Wait for synchronization of the system time

The validity periods entered in certificates and CRLs are only considered by the mGuard when the current date and time are known:

– Through the installed clock (for *mGuard industrial RS* and *mGuard delta*)

– By synchronizing the system time (see “Time and Date” on page 6-7)

Up until this point, all certificates are considered as invalid.

Authentication >> Certificates >> Certificate settings (continued)	
Enable CRL checking	**Yes:** When CRL checking is enabled, the mGuard consults the CRL (Certificate Revocation List) and checks whether the mGuard certificates are blocked or not. CRLs are issued by the CA and contain the serial numbers of blocked certificates (e.g. certificates which have been registered as stolen). Enter the origin of the CRL under the **CRL** tab page (see "CRL" on page 6-126). When CRL checking is enabled, a CRL must be configured for each *Issuer* of certificates in the mGuard. Absent CRLs lead to certificates being declared invalid. CRLs are verified by the mGuard using a relevant CA certificate. Therefore, all CA certificates belonging to a CRL (i.e. all sub-CA certificates and the root certificate) must be installed on the mGuard. If the validity of a CRL cannot be proven, then it is ignored by the mGuard. If the use of CRLs is activated together with the consideration of validity periods, lists are ignored if their validity period has expired or has not yet started.
CRL download interval	If *Enable CRL checking* is set to **Yes** (see above), then select here the time period after which the CRLs should be downloaded and applied. Enter the origin of the CRL under the **CRL** tab page (see "CRL" on page 6-126). If CRL checking is activated but the CRL download is set to **Never**, then the CRL must be manually loaded on the mGuard so that CRL checking can be performed.

6.5.3.2 Machine Certificates

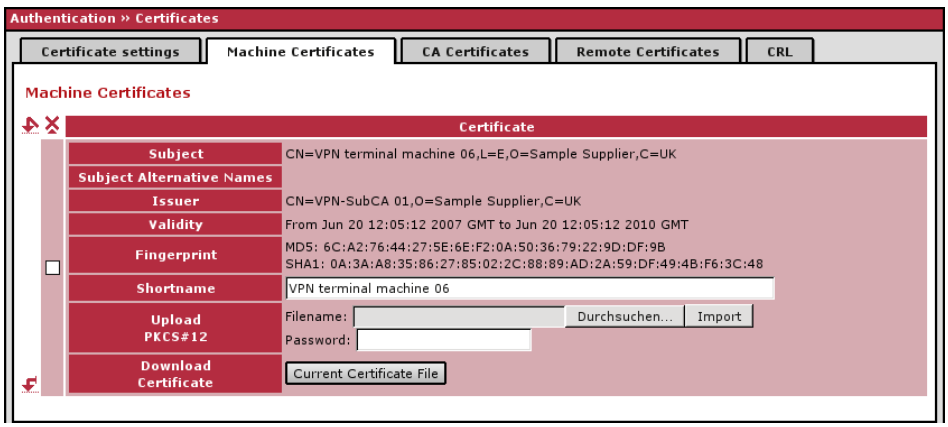
The mGuard authenticates itself to the remote peer using a machine certificate loaded in the mGuard. The machine certificate is the “passport” of an mGuard with which it can authenticate itself to the respective remote peer.

For more details, see “Authentication >> Certificates” on page 6-113.

By importing a PKCS#12 file, the mGuard obtains a private key and the corresponding machine certificate. Several PKCS#12 files can be loaded into the mGuard. The mGuard can then show the remote peer a self-signed certificate or certificate signed by the CA for different connections.

In order to use the installed machine certificate, it must be referenced **additionally** during the configuration of applications (SSH, VPN) so that it can be used for the respective connection or remote access type.

Example of imported machine certificates:



Authentication >> Certificates >> Machine Certificates	
Machine Certificates	**Shows the currently imported X.509 certificates that the mGuard uses to authenticate itself to remote peers (e.g. other VPN gateways).**

To import a new certificate, please proceed as follows:

Importing a new machine certificate

Requirement:

The PKCS#12 file (format: *.p12 or *.pfx) is saved on the connected computer.

Proceed as follows:

- Click on **Browse...** to select the file.
- Enter the password that is used for protection of the PKCS#12 file private key in the *Password* field.
- Click on **Import**.

  After the import, the installed certificate can be seen under *Certificate*.
- Remember to save the imported certificate along with the other entries by clicking on **Apply**.

Shortname

During the machine certificate import process, the CN attribute from the certificate subject field is suggested as the short name (providing the *Shortname* field is empty at this point). This name can be adopted or another name can be chosen.

- Name entry (whether the suggested one or another) is mandatory. The names must be unique, meaning they must not be used more than once.

Use of the short name:

During the configuration of

– SSH (*Management >> System Settings menu, Shell access*),

– HTTPS (*Management >> Web Settings menu, Access*) and

– VPN connections (*IPsec VPN >> Connections* menu),

the imported certificates in the mGuard are given as a selection list.

The certificates are displayed under the short name entered for each individual certificate on this page.

For this reason, the entry of a name is necessary.

Creating a certificate copy

You can create a copy of the imported machine certificate (e.g. for the remote peer so that this can authenticate the mGuard). This copy does not contain the private key, and can be made public at any time.

To do this, proceed as follows:

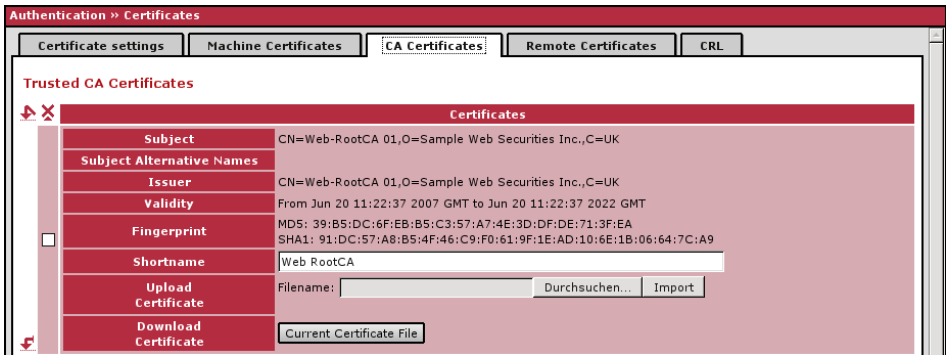
- Click on the **Current Certificate File** button on the machine certificate next to the *Download Certificate* row title.
- Make the desired entries in the dialog that opens.

6.5.3.3 CA Certificates

CA certificates are those from a Certificate Authority (CA). CA certificates are used to check whether the certificates shown by remote peers are authentic.

The check is made as follows: The issuing authority (CA) is entered as Issuer in the certificate shown by the remote peer. These details can be checked for authenticity by the same Issuer using the local CA certificate. For more details, see “Authentication >> Certificates” on page 6-113.

Example of imported CA certificates:



Authentication >> Certificates >> CA Certificates	
Trusted CA Certificates	**Shows the current imported CA certificates.**

To import a new certificate, please proceed as follows:

Importing a CA certificate

Requirement:

The file (file name extension: *.cer, *.pem or *.crt) is saved on the connected computer.

Proceed as follows:

- Click on **Browse...** to select the file.
- Click on **Import**.
  After the import, the installed certificate can be seen under *Certificate*.
- Remember to save the imported certificate along with the other entries by clicking on **Apply**.

Shortname

During the CA certificate import process, the CN attribute from the certificate subject field is suggested as the short name (providing the “shortname” field is empty at this point). This name can be adopted or another name can be chosen.

- Name entry (whether the suggested one or another) is mandatory. The names must be unique, meaning they must not be used more than once.

Use of the short name:

During the configuration of

– SSH (*Management >> System Settings menu, Shell access*),
– HTTPS (*Management >> Web Settings menu, Access*) and
– VPN connections (*IPsec VPN >> Connections* menu),

the imported certificates in the mGuard are given as a selection list. The certificates are displayed under the short name entered for each individual certificate on this page. For this reason, the entry of a name is necessary.

Creating a certificate copy

You can make a copy of the imported CA certificate.

To do this, proceed as follows:

- Click on the **Current Certificate File** button on the CA certificate next to the *Download Certificate* row title. Make the desired entries in the dialog that opens.

6.5.3.4 Remote Certificates

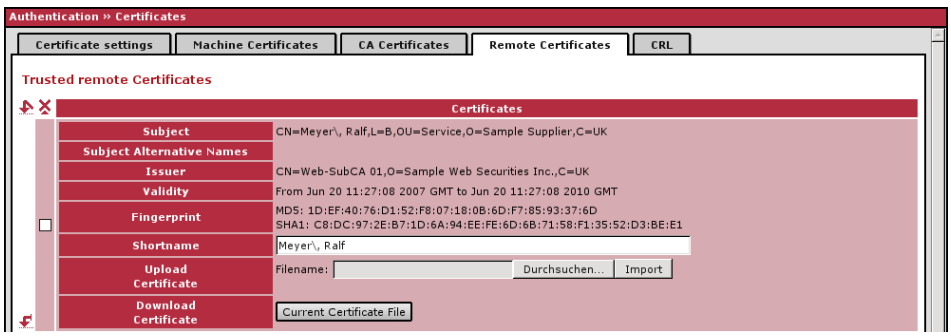
A remote certificate is a copy of the certificate that is used by a remote peer to authenticate itself to the mGuard.

Remote certificates are files received through a trustworthy channel from operators of possible remote peers (file name extension: *.cer, *.pem or *.crt). Load these files onto the mGuard so that bilateral authentication can take place. The remote certificates of several possible remote peers can be installed.

The remote certificate for authentication of a VPN connection (or VPN connection channels) is installed in the *IPsec VPN* >> *Connections* menu.

For more details, see “Authentication >> Certificates” on page 6-113.

Example of imported remote certificates:



Authentication >> Certificates >> Remote Certificates	
Trusted remote Certificates	**Shows the current imported remote certificates.**

Importing a new certificate

Requirement:

The file (file name extension: *.cer, *.pem or *.crt) is saved on the connected computer.

Proceed as follows:

- Click on **Browse...** to select the file.
- Click on **Import**.
  After the import, the installed certificate can be seen under *Certificate*.
- Remember to save the imported certificate along with the other entries by clicking on **Apply**.

Shortname

During the remote certificate import process, the CN attribute from the certificate subject field is suggested as the short name (providing the *Shortname* field is empty at this point). This name can be adopted or another name can be chosen.

- Name entry (whether the suggested one or another) is mandatory. The names must be unique, meaning they must not be used more than once.

Use of the short name:

During the configuration of

– SSH (*Management >> System Settings menu, Shell access*) and
– HTTPS (*Management >> Web Settings menu, Access*)

the imported certificates in the mGuard are given as a selection list. The certificates are displayed under the short name entered for each individual certificate on this page.

For this reason, the entry of a name is necessary.

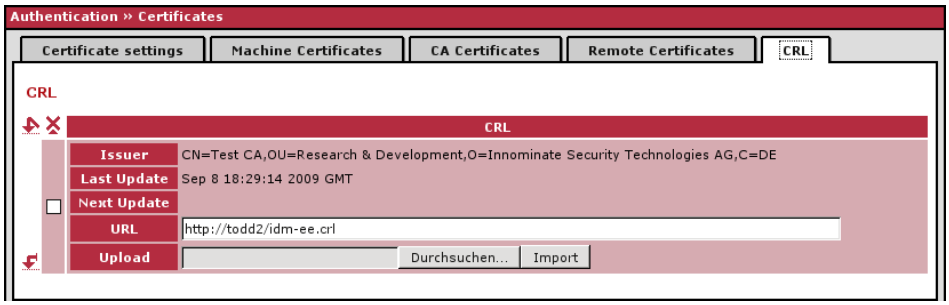
Creating a certificate copy

You can make a copy of the imported remote certificate.

To do this, proceed as follows:

- Click on the **Current Certificate File** button on the remote certificate next to the *Download Certificate* row title. Make the desired entries in the dialog that opens.

6.5.3.5 CRL



Authentication >> Certificates >> CRL	
CRL	CRL = Certificate Revocation List The CRL is a list containing the serial numbers of blocked (revoked) certificates. This page is used for the configuration of sites where the mGuard should download CRLs in order to use them. Certificates are only checked when **Yes** is set under **Enable CRL checking** (see "Certificate settings" on page 6-118). A CRL with the same issuer name must be present for each issuer name entered in the checked certificate. If a CRL is absent and CRL checking is enabled, then the certificate is declared invalid.
Issuer	Information read directly from the CRL by the mGuard: Shows the issuer of the affected CRL.
Last Update	Information read directly from the CRL by the mGuard: Time and date of creation for CRL currently present on the mGuard.
Next Update	Information read directly from the CRL by the mGuard: Estimated time and date when the CA will next issue a new CRL. These entries are not influenced or considered by the CRL download interval.
URL	Enter the CA URL where CRL downloads are obtained if the CRL should be downloaded on a regular basis (as defined in the **CRL download interval** under the *Certificate settings* tab page (see "Certificate settings" on page 6-118)).
Upload	If the CRL is present in file form, then it can be loaded onto the mGuard manually. • To do this, click on the **Browse...** button, then select the file and click on **Import**. • Remember to save the imported CRL along with the other entries by clicking on Apply.

6.6 Network Security menu

This menu is **not** available on the **mGuard blade controller**.

6.6.1 Network Security >> Packet Filter

The mGuard comes with an integrated *Stateful Packet Inspection Firewall*. The connection data for each active connection is collected in a database (connection tracking). Therefore, it is only necessary to define rules for one direction. Only data from the opposite direction of the connection is allowed through, and none other.

A side-effect is that existing connections are not cancelled during reconfiguration, even if a corresponding new connection can no longer be setup.

Factory defaults for the firewall:

– All incoming connections are rejected (except VPN).
– Data packets of all outgoing connections are passed through.

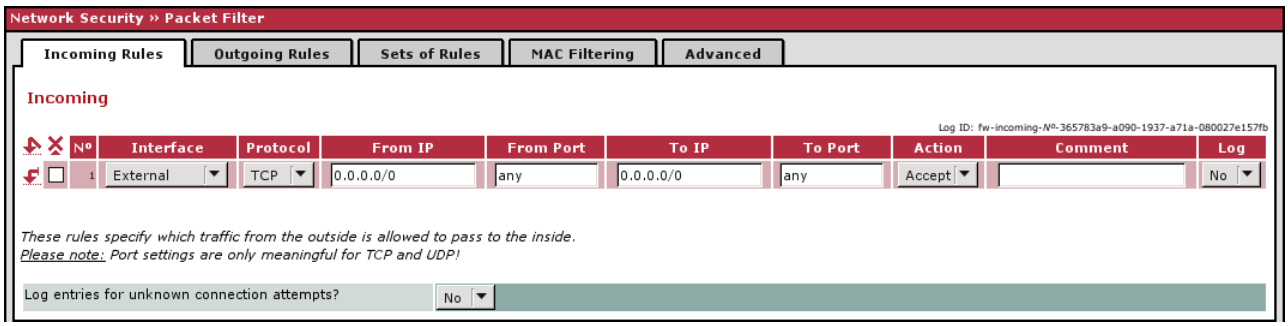
Firewall rules here have an effect on the firewall that is constantly active, with the exception of:

– **VPN connections**. Individual firewall rules are defined for VPN connections (see “IPsec VPN >> Connections” on page 6-165, “Firewall” on page 6-183).
– **User firewall**. If a user logs in with defined firewall rules, then these take priority (see “Network Security >> User Firewall” on page 6-141). After this, the constantly active firewall rules then come into effect.

If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied.

If there are other suitable rules further down the list, these are ignored.

6.6.1.1 Incoming Rules



Network Security >> Packet Filter >> Incoming Rules

Incoming

Lists the firewall rules that have been set. These rules apply for incoming data connections that were initiated externally.

If no rule has been set, the data packets for all incoming connections (except VPN) are dropped (= factory default).

Interface — External / External 2 / Any External[1]

Specifies over which interface the data packets come in so that the rule applies to them. **Any External** refers to the **External** and **External 2** interfaces. These interfaces are only available for mGuard models that have a serial port with external access.

Protocol — TCP, UDP, ICMP, All.

From IP / To IP — **0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

From Port / To Port — (Only evaluated for TCP and UDP protocols)

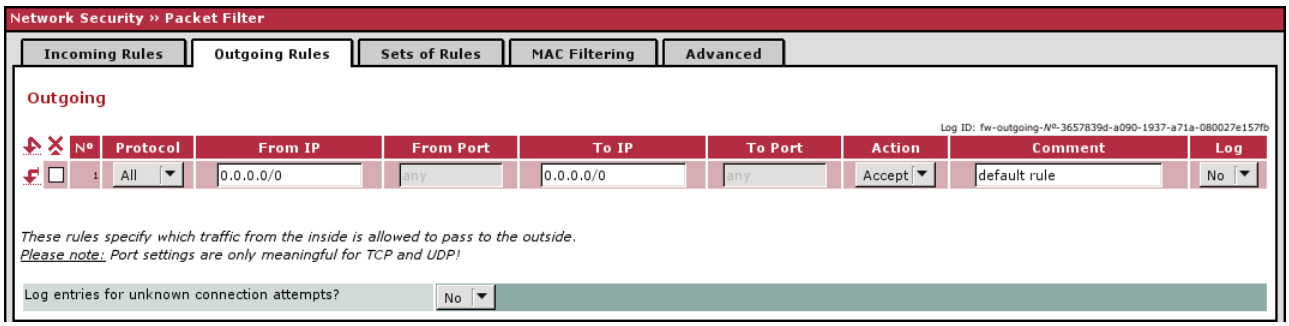
- **any** describes any selected port.
- **startport:endport** (e.g. 110:120) defines a range of ports.

You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Network Security >> Packet Filter >> Incoming Rules (continued)		
	Action	**Accept** means that data packets may pass through. **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. In Stealth mode, **Reject** has the same effect as **Drop**. **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts. **Name of rule records**, if defined. When a rule record name is entered, the firewall rules saved under this name come into effect (see the *Sets of Rules* tab page).
	Comment	Freely selectable comment for this rule.
	Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)
	Log entries for unknown connection attempts	When set to **Yes**, all attempts to establish a connection that are not covered by the rules defined above are logged (factory default: **No**).

[1] *External 2* and *Any External* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

6.6.1.2 Outgoing Rules



Network Security >> Packet Filter >> Outgoing Rules

Outgoing

Lists the firewall rules that have been set. These rules apply for outgoing data connections that were initiated internally in order to communicate with a remote peer.

Factory default: A rule is set that allows all outgoing connections.

If no rule is set, then all outgoing connections are forbidden (except VPN).

Protocol — TCP, UDP, ICMP, All.

From IP / To IP — **0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

From Port / To Port — (Only evaluated for TCP and UDP protocols)

- **any** describes any selected port.
- **startport:endport** (e.g. 110:120) defines a range of ports.

You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Action — **Accept** means that data packets may pass through.

Reject means that the data packets are rejected. The sender is informed that the data packets have been rejected.

> In Stealth mode, **Reject** has the same effect as **Drop**.

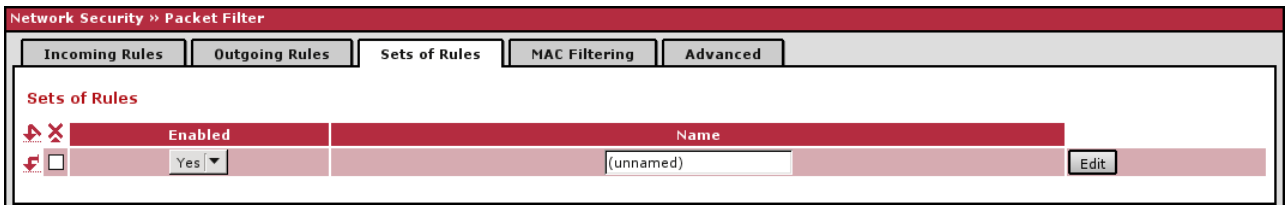
Drop means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.

Name of rule records, if defined. When a rule record name is entered, the firewall rules saved under this name come into effect (see the *Sets of Rules* tab page).

Comment — Freely selectable comment for this rule.

Network Security >> Packet Filter >> Outgoing Rules (continued)		
	Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)
	Log entries for unknown connection attempts	When set to **Yes**, all attempts to establish a connection that are not covered by the rules defined above are logged (factory default: **No**).

6.6.1.3 Sets of Rules



Rule records are defined and stored for structuring incoming and outgoing rules. A set of rules can then be referred to in an incoming or outgoing rule, so that the rules contained within the set of rules are applied there.

It is also possible to refer to another defined rule record during rule record definition (i.e. inserting this as a module in the current rule record).

Making a new rule record definition

- Click on the **Edit** button on the right side of the rule record table under the "(unnamed)" entry.
- If the "(unnamed)" entry cannot be seen, then open a further line in the rule record table.

Editing a rule record

- Click on the **Edit** button to the right of the entry.
- If a firewall rule record is comprised of multiple firewall rules, they are searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

Network Security >> Packet Filter >> Sets of Rules

Sets of Rules

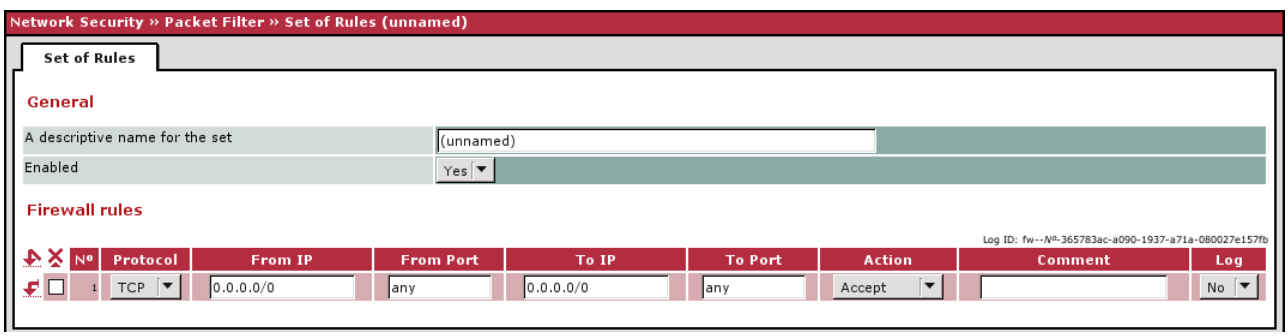
Lists all defined firewall rule records.

Sets of rules are only used when they are referred to on the *Incoming Rules* or *Outgoing Rules* tab page.

Only if all the criteria of a firewall rule are fulfilled is a set of rules that is referred to in this firewall rule used.

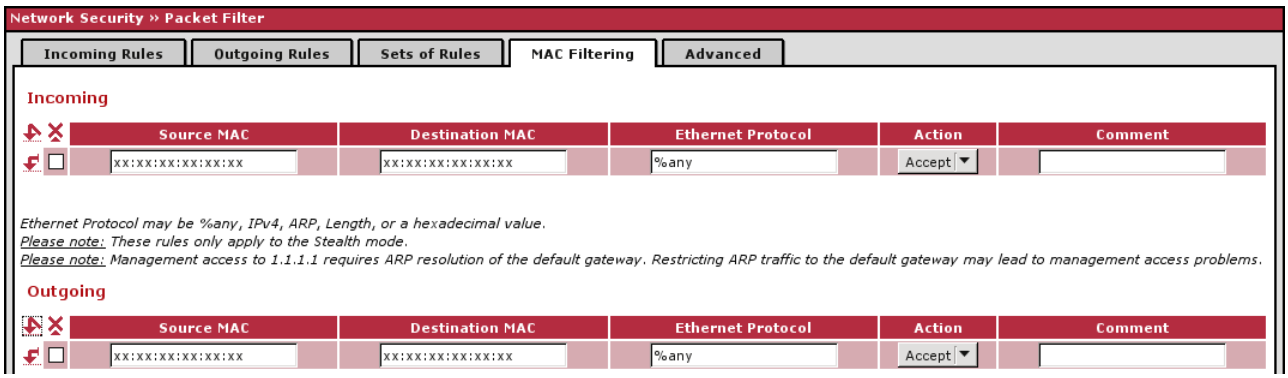
Enabled	Activates / deactivates the relevant rule record.
Name	Name of the rule record. The name is defined during creation of the rule record.

The *Set of Rules* page is displayed after clicking on the **Edit** button:



Network Security >> Packet Filter >> Sets of Rules (continued)		
General	**A descriptive name for the set**	Freely selectable name. It must clearly define the rule record in question. A rule record can be referred to in the incoming and outgoing rule lists using this name. To do this, the relevant rule record name is selected in the *Action* column.
	Enabled	Activates / deactivates the relevant rule record.
Firewall rules	**Protocol**	TCP, UDP, ICMP, All.
	From IP / To IP	**0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).
	From Port / To Port	(Only evaluated for TCP and UDP protocols) – **any** describes any selected port. – **startport:endport** (e.g. 110:120) defines a range of ports. You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).
	Action	**Accept** means that data packets may pass through. **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. In Stealth mode, **Reject** has the same effect as **Drop**. **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts. **Name of rule records**, if defined. Aside from “Accept”, “Reject” and “Drop”, the selection list also gives the names of previously defined rule records. If a name is selected (referred to), then the rules in this set of rules are applied here. If the rules from the applied set of rules cannot be used and put into effect with “Accept”, “Reject” or “Drop”, the rule processing continues with the rule following the one from which the set of rules was referred to.
	Comment	Freely selectable comment for this rule.
	Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)

6.6.1.4 MAC Filtering



The MAC filter is only applied to data packets that come in or go out over the Ethernet port. Data packets that come in or go out over a modem connection for mGuard models with a serial port[1] are not picked up by the MAC filter because no Ethernet protocol is used here.

Along with the packet filter (OSI layer 3/4) that can filter data according to ICMP messages and TCP/UDP connections, the mGuard can additionally be set with a MAC filter (OSI layer 2) when operating in *Stealth* mode. A MAC filter (layer 2) filters according to MAC addresses and Ethernet protocols.

In contrast to the packet filter, the MAC filter is stateless. This means additional rules must be created in the opposite direction where necessary.

When no rules are defined, all ARP and IP packets are allowed.

When defining MAC filter rules, pay attention to the screen display.

Rules defined here have priority over packet filter rules.

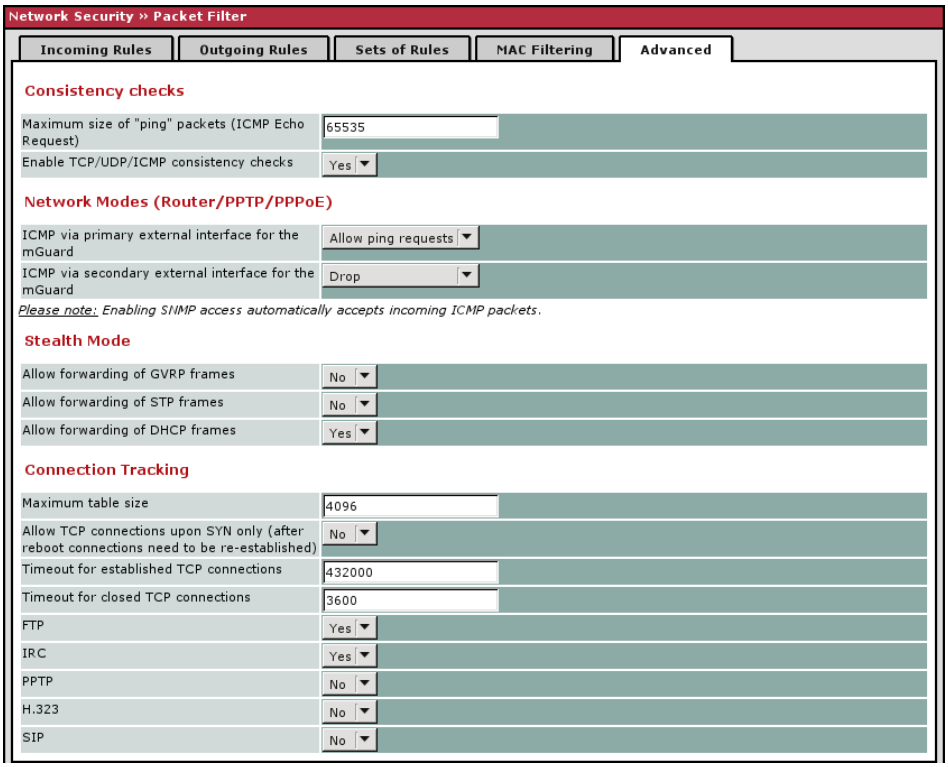
The MAC filter does not support logging.

Network Security >> Packet Filter >> MAC Filtering		
Incoming	**Source MAC**	Definition of the source MAC address: xx:xx:xx:xx:xx:xx stands for all MAC addresses.
	Destination MAC	Definition of the destination MAC address: xx:xx:xx:xx:xx:xx stands for all MAC addresses. ff:ff:ff:ff:ff:ff is the broadcast MAC address where all ARP requests are sent, for example.
	Ethernet Protocol	**%any** stands for all Ethernet protocols. Additional protocols can be specified in name or hexadecimal value, for example: – IPv4 or 0800 – ARP or 0806
	Action	**Accept** means that data packets may pass through. **Drop** means that data packets may not pass through (dropped).
	Comment	Freely selectable comment for this rule.

1 mGuard centerport, mGuard industrial RS, mGuard blade, EAGLE mGuard, mGuard delta

6.6.1.5 Advanced

The following settings influence the basic behavior of the firewall.



Network Security >> Packet Filter >> Advanced		
Consistency checks	**Maximum size of “ping” packets (ICMP Echo Request)**	Relates to the size of the complete packet including the header. Normally the packet size is 64 bytes, although it can be larger. If oversized packets should be blocked (to prevent bottlenecks), a maximum value can be entered. This should be more than 64 bytes, as normal ICMP echo requests should not be blocked.
	Enable TCP/UDP/ICMP consistency checks	When this option is set to **Yes**, the mGuard performs various checks for wrong checksums, packet sizes etc. and drops packets failing the check. The factory default for this option is **Yes**.

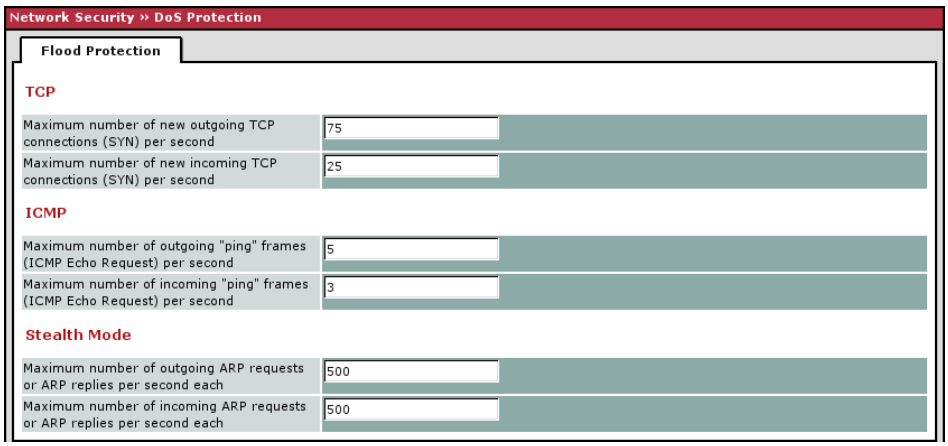
Network Security >> Packet Filter >> Advanced (continued)		
Network Modes (Router/PPTP/PPPoE)	**ICMP via primary external interface for the mGuard** **ICMP via secondary external interface for the mGuard**	With this option you can control which ICMP messages from the external network are accepted by the mGuard via the primary / secondary external interface. Regardless of this setting, incoming ICMP packets are always accepted if SNMP access is enabled. **Drop:** All ICMP messages directed to the mGuard are dropped. **Allow ping requests:** Only ping messages sent to the mGuard (ICMP type 8) are accepted. **Allow all ICMPs:** All ICMP messages to the mGuard are accepted.
Stealth Mode	**Allow forwarding of GVRP frames**	**Yes / No** The GARP VLAN Registration Protocol (GVRP) is used by GVRP capable switches to exchange configuration information. When set to **Yes**, GVRP frames are allowed to pass through the mGuard in *Stealth* mode.
	Allow forwarding of STP frames	**Yes / No** The Spanning Tree Protocol (STP) (802.1d) is used by bridges and switches to detect and consider loops in the network topology. When set to **Yes**, STP frames are allowed to pass through the mGuard in *Stealth* mode.
	Allow forwarding of DHCP frames	**Yes / No** When set to **Yes**, the client is allowed to retrieve an IP address using DHCP independently from the firewall rules for outgoing data. The default setting here is **Yes**.

Network Security >> Packet Filter >> Advanced (continued)		
Connection Tracking	**Maximum table size**	This entry defines the upper limit. This is set to a level that can never be reached during normal operation. However, it is reached easily when attacks occur, thus giving additional protection. If special requirements are present in your operating surroundings, then you can increase this value.
	Allow TCP connections upon SYN only	**Yes / No** SYN is a special data packet in TCP/IP connections that marks the beginning of a connection attempt. **No** (default): The mGuard also allows connections where the beginning is not specified. This means that the mGuard can carry out a reboot during an established connection without the connection being stopped. **Yes**: The mGuard must register the SYN packet of an existing connection. Otherwise, the connection is stopped. This means that the connection is broken if the mGuard carries out a reboot during the establishment of a connection. Attacks and hijacks on existing connections are thus prevented.
	Timeout for established TCP connections	If a TCP connection is not used after this time period, then the connection data is deleted. A connection assigned by NAT (not 1:1 NAT) must then be newly established. The factory default is 432000 seconds (5 days).
	FTP	**Yes / No** If an outgoing connection is established to call up data during the FTP protocol, then there are two variations of data transfer. With “active FTP”, the called server establishes an additional counter-connection to the caller in order to transfer data over this connection. With “passive FTP”, the client establishes this additional connection to the server for data transfer. FTP must be set to **Yes** (default) so that additional connections can pass through the firewall.
	IRC	**Yes / No** Similar to FTP: For IRC chat over the Internet to work properly, incoming connections must be allowed following an active connection attempt. IRC must be set to **Yes** (default) so that additional connections can pass through the firewall.
	PPTP	**Yes / No (default: No)** Must be set to **Yes** if VPN connections are established using PPTP from local computers to external computers without mGuard assistance.

Network Security >> Packet Filter >> Advanced (continued)		
	H.323	**Yes / No (default: No)** Protocol used for communication meetings between two or more participants. Used for audio-visual transfers. This protocol is older than SIP.
	SIP	**Yes / No (default: No)** The SIP (Session Initiation Protocol) is used for communication meetings between two or more participants. Often used during IP telephony. By selecting **Yes**, it is possible for the mGuard to monitor the SIP and add necessary firewall rules dynamically if further communication channels are established in the same session. When NAT is also activated, one or more locally connected computers can communicate with external computers by SIP through the mGuard.

6.6.2 Network Security >> DoS Protection

6.6.2.1 Flood Protection


Network Security » DoS Protection
Flood Protection
TCP
Maximum number of new outgoing TCP connections (SYN) per second
75
Maximum number of new incoming TCP connections (SYN) per second
25
ICMP
Maximum number of outgoing "ping" frames (ICMP Echo Request) per second
5
Maximum number of incoming "ping" frames (ICMP Echo Request) per second
3
Stealth Mode
Maximum number of outgoing ARP requests or ARP replies per second each
500
Maximum number of incoming ARP requests or ARP replies per second each
500

Network Security >> DoS Protection >> Flood Protection		
TCP	**Maximum number of new incoming / outgoing TCP connections (SYN) per second**	Outgoing: Factory default: 75 Incoming: Factory default: 25 These are the upper limits for allowed incoming and outgoing TCP connections per second. These are set to a level that can never be reached during normal operation. However, they can be reached easily when attacks occur, thus giving additional protection. If special requirements are present in your operating surroundings, then these values can be increased.
ICMP	**Maximum number of incoming / outgoing “ping” frames (ICMP Echo Request) per second**	Outgoing: Factory default: 5 Incoming: Factory default: 3 These are the upper limits for allowed incoming and outgoing ping frames per second. These are set to a level that can never be reached during normal operation. However, they can be reached easily when attacks occur, thus giving additional protection. If special requirements are present in your operating surroundings, then these values can be increased. The value **0** means that no “ping” packets are allowed in or out.

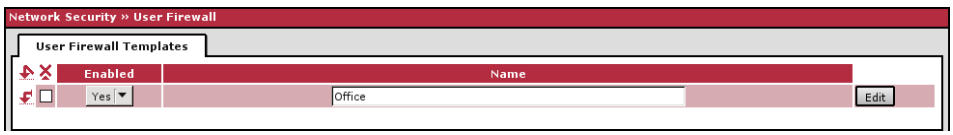
Network Security >> DoS Protection >> Flood Protection (continued)		
Stealth Mode	**Maximum number of incoming / outgoing ARP requests or ARP replies per second each**	Factory default: 500 These are the upper limits for allowed incoming and outgoing ARP requests or replies per second. These are set to a level that can never be reached during normal operation. However, they can be reached easily when attacks occur, thus giving additional protection. If special requirements are present in your operating surroundings, then these values can be increased.

6.6.3 Network Security >> User Firewall

The user firewall is used exclusively by firewall users (i.e. users that are registered as firewall users (see “Authentication >> Firewall Users” on page 6-110)).

Each firewall user can be assigned a set of firewall rules, also called a template.

6.6.3.1 User Firewall Templates



All defined user firewall templates are listed here. A template can consist of several firewall rules. A template can be assigned to several users.

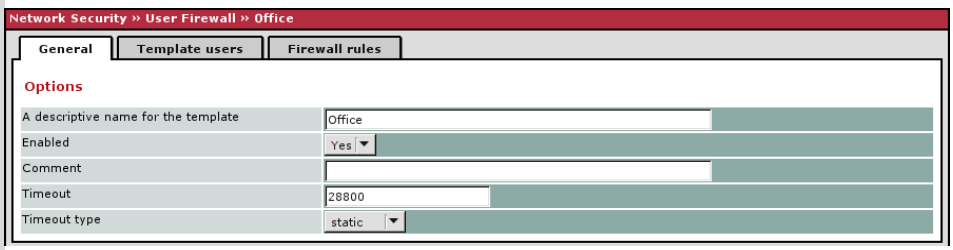
Making a new template definition:

- Click on the **Edit** button on the right side of the template table under the “(unnamed)” entry.
- If the “(unnamed)” entry cannot be seen, then open a further line in the rule record table.

Editing a rule record:

- Click on the **Edit** button to the right of the entry.

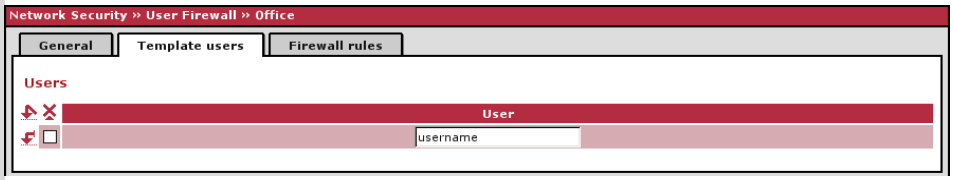
Network Security >> User Firewall >> User Firewall Templates		
	Enabled	Activates / deactivates the relevant template.
	Name	Name of the template. The name is defined during creation of the template.
General	After clicking on the **Edit** button, the following tab page appears:	
Options	**A descriptive name for the template**	You can name or rename the user firewall template as desired.
	Enabled	**Yes / No** When **Yes** is selected, the user firewall template becomes active as soon as firewall users log into the mGuard who are listed on the *Template users* tab page (see below) and who have been assigned this template. It does not matter from which computer and under which IP address the user logs in. The assignment of user firewall rules is based on the authentication data that the user enters during login (user name, password).



Network Security >> User Firewall >> User Firewall Templates (continued)		
	Comment	Optional explanatory text
	Timeout	Default: 28800. Indicates the time in seconds at which point the firewall rules are deactivated. If the user session lasts longer than the timeout time defined here, then the user has to login again.
	Timeout type	static / dynamic With a *static* timeout, users are logged out automatically as soon as the specified timeout expires. With a *dynamic* timeout, users are logged out automatically after all connections are closed by the user or have expired on the mGuard, and the timeout has elapsed. An mGuard connection expires when no data is sent for the connection over the following periods.
	Connection expiration period after non-usage – TCP 5 days (this value is configurable, see 6-137) 120 additional seconds are added after connection closure. This also applies to connections closed by the user. – UDP 30 seconds after data traffic in one direction 180 seconds after data traffic in both directions – ICMP 30 seconds – Others 10 minutes	

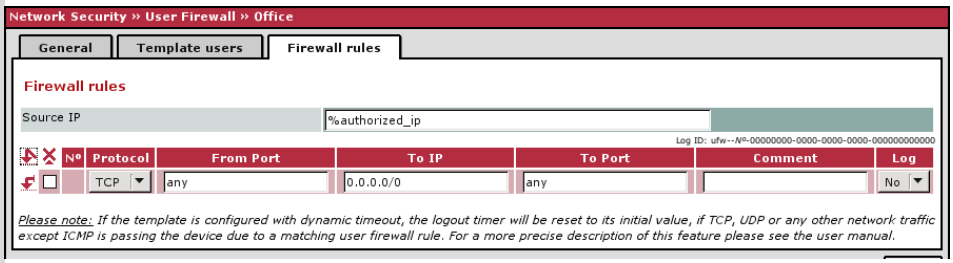
Network Security >> User Firewall >> User Firewall Templates >> Edit > …

Template users



Enter the user names here. The names must correspond to those that have been defined in the Authentication >> Firewall Users menu (see page 6-110).

Firewall rules


Network Security » User Firewall » Office
General
Template users
Firewall rules
Firewall rules
Source IP
%authorized_ip
Nº
Protocol
From Port
To IP
To Port
Comment
Log
TCP
any
0.0.0.0/0
any
No
Please note: If the template is configured with dynamic timeout, the logout timer will be reset to its initial value, if TCP, UDP or any other network traffic except ICMP is passing the device due to a matching user firewall rule. For a more precise description of this feature please see the user manual.

Source IP

IP address from which connections are permitted to be set up. If this is to be the IP address from which the user connected to the mGuard, the placeholder “%authorized_ip” should be used.

If multiple firewall rules are defined and activated for a user, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

Protocol

All means: TCP, UDP, ICMP and other IP protocols.

From Port / To Port

(Only evaluated for TCP and UDP protocols)

– **any** describes any selected port.

– **startport:endport** (e.g. 110:120) > range of ports.

You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

To IP

0.0.0.0/0 means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

Comment

Freely selectable comment for this rule.

Log

For each firewall rule, you can specify whether the use of the rule

– should be logged (set *Log* to **Yes**) or

– should not be logged (set *Log* to **No** – factory default)

6.7 CIFS Integrity Monitoring menu

This menu is **not** available on the **mGuard blade controller**.

In Stealth network mode, CIFS integrity checking is not possible without a management IP address and the CIFS server for the antivirus scan is not supported.

There are two possible methods for checking network drives for viruses using CIFS Integrity Monitoring:

– CIFS Integrity Checking
– CIFS Antivirus Scan Connector

CIFS Integrity Checking

In **CIFS Integrity Checking**, Windows network drives are checked as to whether certain files (e.g. *.exe, *.dll) have been changed. Changes to these files indicate a virus or unauthorized file access.

CIFS Antivirus Scan Connector

In the **CIFS Antivirus Scan Connector**, the mGuard allows an antivirus scan of drives that are otherwise not externally accessible (e.g. production cells). The mGuard mirrors a drive externally in order to carry out the antivirus scan. Additional antivirus software is necessary in this procedure. Set the necessary read access for your antivirus software.

Setting options for CIFS Integrity Checking

– Which network drives are known by the mGuard (see “CIFS Integrity Monitoring >> Importable Shares” on page 6-145).
– Which access type is allowed (see “CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings” on page 6-146).
– At which intervals the drives should be checked (see “CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit” on page 6-148).
– Which file types should be checked (see “CIFS Integrity Monitoring >> CIFS Integrity Checking >> Filename Patterns” on page 6-150).
– The type of warning when a change is detected (e.g. by e-mail (see “CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings” on page 6-146) or by SNMP (see “CIFS integrity traps” on page 6-43)).

Setting options for the CIFS Antivirus Scan Connector

– Which network drives are known by the mGuard (see “CIFS Integrity Monitoring >> Importable Shares” on page 6-145).
– Which access type is allowed (read-only access or read/write access (see “CIFS Integrity Monitoring >> CIFS Antivirus Scan Connector” on page 6-155)).

6.7.1 CIFS Integrity Monitoring >> Importable Shares

Requirements:

You can enter the network drives that the mGuard should check regularly here.

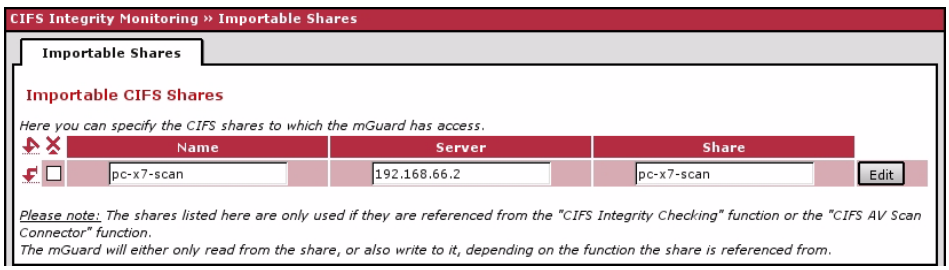
In order for the network drives to be checked, you must also refer to these drives in one of the two methods (CIFS Integrity Checking or CIFS Antivirus Scan Connector).

The reference to the network drives can be set as follows:

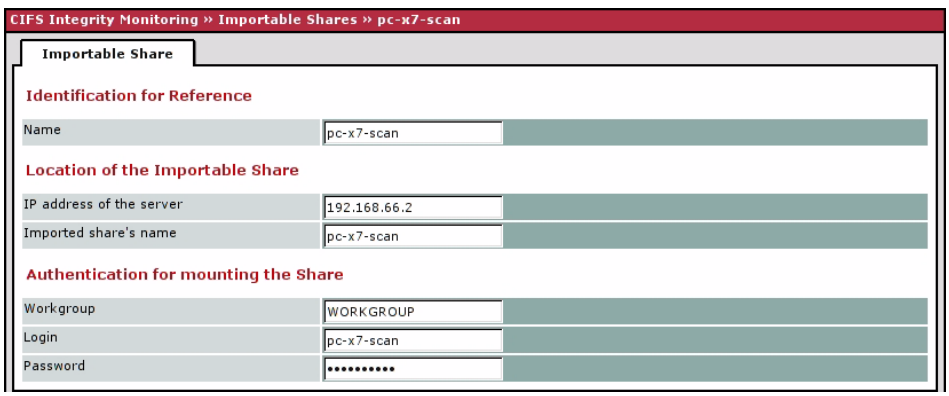
– In CIFS Integrity Checking, see “Checked CIFS Share” on page 6-147.

– In the CIFS Antivirus Scan Connector, see “CIFS Antivirus Scan Connector” on page 6-155.

6.7.1.1 Importable Shares


CIFS Integrity Monitoring » Importable Shares
Importable Shares
Importable CIFS Shares
Here you can specify the CIFS shares to which the mGuard has access.
Name
Server
Share
pc-x7-scan
192.168.66.2
pc-x7-scan
Edit
Please note: The shares listed here are only used if they are referenced from the "CIFS Integrity Checking" function or the "CIFS AV Scan Connector" function.
The mGuard will either only read from the share, or also write to it, depending on the function the share is referenced from.

CIFS Integrity Monitoring >> Importable Shares		
Importable Shares	**Name**	Name of the network drive to be checked (internal name used in the configuration).
	Server	IP address of the authorized server.
	Share	Name of the network drive where the drive is prepared by the server.
		Click on **Edit** to make the settings.



CIFS Integrity Monitoring >> Importable Shares >> Edit		
Identification for referencing	**Name**	Name of the network drive to be checked (internal name used in the configuration).
Location of network drive	**IP address of the server**	IP address of the server whose network drive should be checked.

CIFS Integrity Monitoring >> Importable Shares >> Edit (continued)		
Authentication for connecting the network drive	**Imported share's name**	Directory which should be checked on the authorized server shown above.
	Workgroup	Name of the workgroup to which the network drive belongs.
	Login	Login for the server.
	Password	Password for the login.

6.7.2 CIFS Integrity Monitoring >> CIFS Integrity Checking

In **CIFS Integrity Checking**, Windows network drives are checked as to whether certain files (e.g. *.exe, *.dll) have been changed. Changes to these files indicate a virus or unauthorized file access.

Integrity database

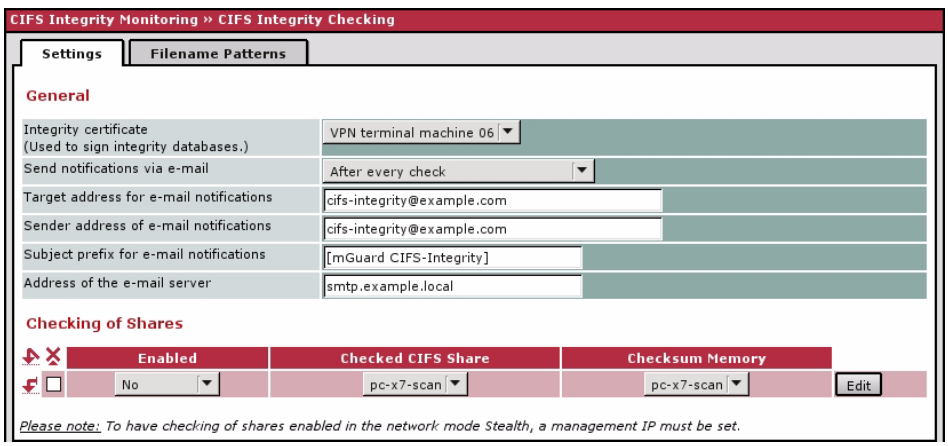
If a checked network drive is reconfigured, then an integrity database must be created.

This integrity database forms the basis for comparison when checking the network drive regularly. The checksums of all monitored files are recorded here. The integrity database is protected against manipulation.

The database is either created explicitly due to a specific reason (see "CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Actions" on page 6-153) or at the first regular check of the drive.

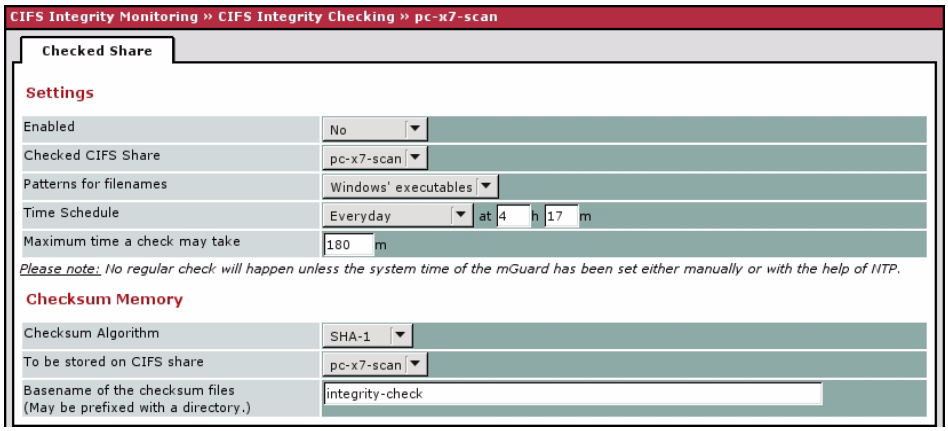
The integrity database must be created again following an intentional manipulation of the files on the network drive. Unauthorized manipulation of the relevant files cannot be detected as long as a valid integrity database is not in place.

6.7.2.1 Settings



CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings		
General	**Integrity certificate (Used to sign integrity databases.)**	Used for signing and checking the integrity database so that it cannot be replaced or manipulated by an intruder without being detected. Further information on certificates can be found under "Machine Certificates" on page 6-120.

CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings (continued)		
	Send notifications via e-mail	**After every check**: An e-mail is sent to the address below after every check. **No:** No e-mails are sent to the address below. **Only with faults and deviations**: An e-mail is sent to the address below when deviations are detected in CIFS Integrity Checking, or when the check is not made due to an access error.
	Target address for e-mail notifications	An e-mail is sent to this address after every check, or only when deviations are detected in CIFS Integrity Checking, or when the check could not be made due to an access error.
	Sender address of e-mail notifications	This address is entered as the sender in the e-mail.
	Address of the e-mail server	IP address or host name of the e-mail server used for sending the e-mail.
	Subject prefix for e-mail notifications	Text entered in the subject field of the e-mail.
Checking of Shares	**Enabled**	**No:** No check of this network drive is triggered. The mGuard has not connected this drive. A status cannot be accessed. **Yes:** A check of this network drive is triggered regularly. **Suspended:** The check has been suspended until further notice. The status can be accessed.
	Checked CIFS Share	Name of the network drive to be checked (entered under *CIFS Integrity Monitoring* >> *Importable Shares* >> *Edit*).
	Checksum Memory	In order to make the check, the mGuard must be provided with a network drive for storing the files. The checksum memory can be accessed via the external network interface.
	Click on **Edit** to make further settings for the check of the network drive.	



CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit

Settings	**Enabled**	**No:** No check of this network drive is triggered. The mGuard has not connected this drive. A status cannot be accessed. **Yes:** A check of this network drive is triggered regularly. **Suspended:** The check is stopped until further notice. The status can be accessed.
	Checked CIFS Share	Name of the network drive to be checked (entered under *CIFS Integrity Monitoring >> Importable Shares >> Edit*).
	Patterns for filenames	Only certain file types are checked (e.g. only executable files such as *.exe and *.dll). You can specify the rules for this under *CIFS Integrity Monitoring >> CIFS Integrity Checking >> Filename Patterns*.

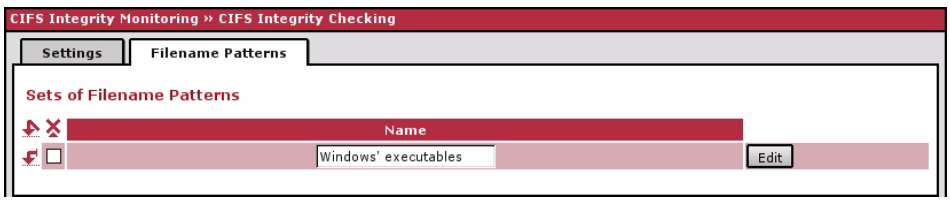
Do not check files that are changed in normal operation, as this could trigger false alarms.

Do not check files that can be simultaneously opened **exclusively** by other programs, as this can lead to access conflicts.

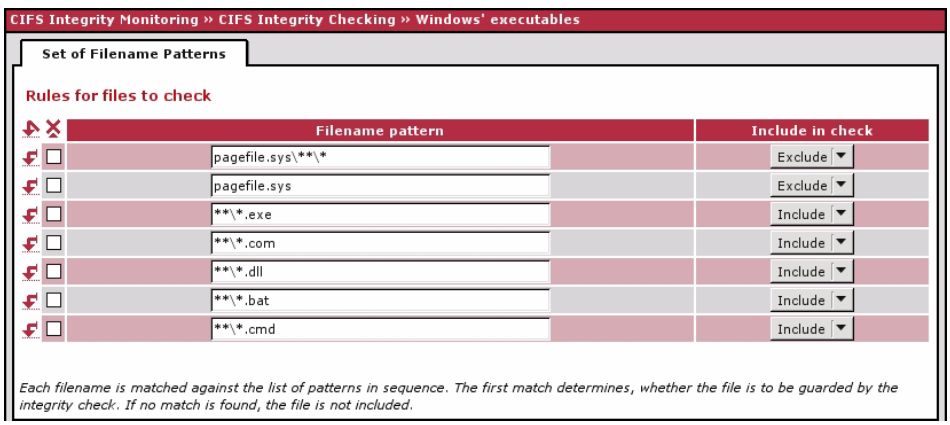
CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit (continued)		
	Time Schedule	Everyday, Mondays, Tuesdays... at xx h, xx m You can start a check every day or on a specific weekday at a specific time (hours, minutes). The mGuard system time must be set for the time schedule to work properly. No integrity checks can be made if the system time is not synchronized. This can be made manually or via NTP (see "Time and Date" on page 6-7). A check is only started when the mGuard is in operation at the set time. If the mGuard is not in operation, a check is not followed up when the mGuard is put into operation at a later date. You can also start the check manually ("CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Actions" on page 6-153).
	Maximum time a check may take	Maximum check period in minutes. You can then ensure that the check is completed in good time (e.g. before a shift is started).
Checksum Memory	**Checksum Algorithm**	**SHA-1** **MD5** **SHA-256** Checksum algorithms such as MD5, SHA-1 or SHA-256 are used to check whether a file has been changed. SHA-256 is more secure than SHA-1, but requires a longer processing time.
	To be stored on CIFS share	In order to make the check, the mGuard must be provided with a network drive for storing the files. The checksum memory can be accessed via the external network interface. The same network drive can be used as a checksum memory for several different checked drives. The base name of the checksum files must then be clearly selected in this case. The mGuard recognizes which version the checksum files on the network drive must have. For example, if it is necessary to restore the contents of the network drive from a backup following a malfunction, then the old checksum files are provided and the mGuard would detect deviations. In this case, the integrity database must be recreated (see "CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Actions" on page 6-153).

CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit (continued)		
	Basename of the checksum files (May be prefixed with a directory.)	The checksum files are stored on the network drive specified above. They can also be stored in a separate directory. The directory name must not start with a backslash (\). Example: Checksumdirectory\integrity-checksum “Checksumdirectory” is the directory, and contains files beginning with “integrity-checksum”.

6.7.2.2 Filename Patterns

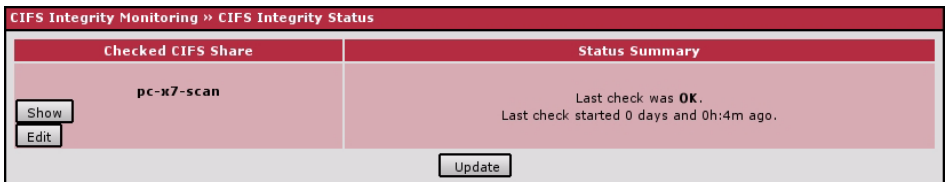


CIFS Integrity Monitoring >> CIFS Integrity Checking >> Filename Patterns		
Sets of Filename Patterns	**Name**	Freely selectable name for the set of rules for the files to be checked. This name must be selected under **CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit** so that the template is active. Click on **Edit** to specify a set of rules for the file to be checked and save this under the defined name.

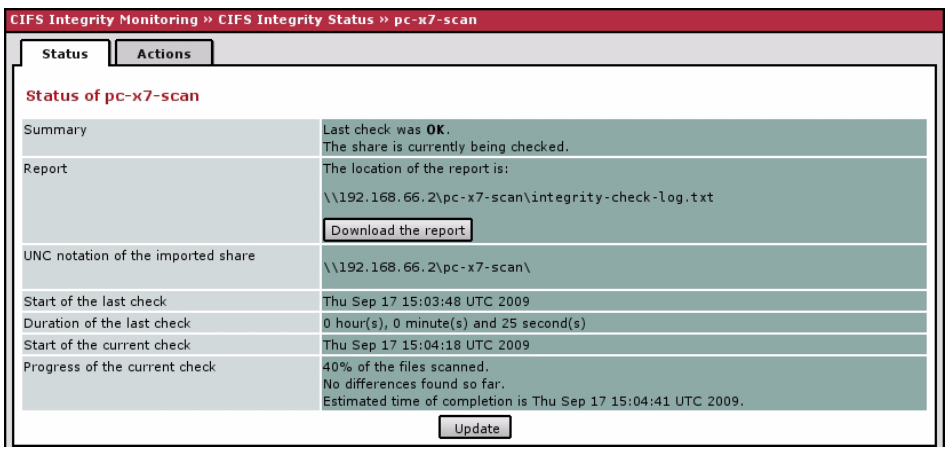


CIFS Integrity Monitoring >> CIFS Integrity Checking >> Filename Patterns >> Edit		
Rules for files to check	**Filename pattern**	The following rules apply here: ***.exe* means that files are checked (or excluded) that are found in any directory and end with **.exe*. Only one placeholder per directory or file name (***) is allowed. Placeholders represent wildcards (e.g. *win**.exe* finds files that end with *.exe* and are found in a directory that begins with *win...*). **** at the start means that any directory is searched, including the uppermost level (when this is empty). This cannot be combined with other characters (e.g. *c*** is not allowed). Example: *Name****.exe applies to all files ending with *.exe that are found in the "*Name*" directory and any subdirectories. Missing files lead to an alarm. Missing files are those files that were present during initialization. An alarm is also triggered when additional files are detected.
	Include in check	**Include:** The files are included in the check. Each file name is compared to the templates in sequence. The first hit is decisive for the inclusion of the file in the integrity check. The file is not included if no hits are detected. **Exclude:** The files are excluded from the check.

6.7.3 CIFS Integrity Monitoring >> CIFS Integrity Status

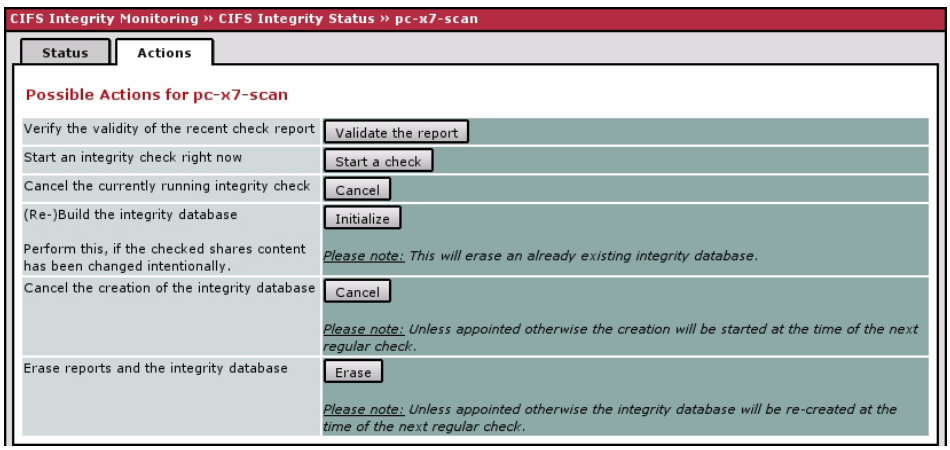


CIFS Integrity Monitoring >> CIFS Integrity Status		
	List with buttons for each individual network drive	
Checked CIFS Share		Click on **Show** to see the check results or carry out actions (e.g. start or cancel check, update integrity database when the checked drives have been intentionally changed). Click on **Edit** to edit the check settings (same as "CIFS Integrity Monitoring >> CIFS Integrity Checking >> Settings >> Edit" on page 6-148).
Status Summary		Result and time of the last checks.
Click on **Update** to see a summary of the latest check results. **Update** applies to all network drives.		


CIFS Integrity Monitoring » CIFS Integrity Status » pc-x7-scan
Status
Actions
Status of pc-x7-scan
Summary
Last check was OK.
The share is currently being checked.
Report
The location of the report is:
\\192.168.66.2\pc-x7-scan\integrity-check-log.txt
Download the report
UNC notation of the imported share
\\192.168.66.2\pc-x7-scan\
Start of the last check
Thu Sep 17 15:03:48 UTC 2009
Duration of the last check
0 hour(s), 0 minute(s) and 25 second(s)
Start of the current check
Thu Sep 17 15:04:18 UTC 2009
Progress of the current check
40% of the files scanned.
No differences found so far.
Estimated time of completion is Thu Sep 17 15:04:41 UTC 2009.
Update

CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Status		
Status of [network drive name according to configuration]	**Summary**	**Last check was OK:** No deviations found. **Last check found x deviation(s):** The exact deviations are found in the check report.
	Report	The check report is found here. It can be downloaded using the **Download the report** button.
	UNC notation of the imported share	\\Servername\drive\

CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Status (continued)		
	Start of the last check	Weekday, month, day, HH:MM:SS (UTC). The actual local time may be different from this time. **Example:** The standard time in Germany is Central European Time (CET), which is UTC plus one hour. Central European Summer Time applies in summer, which is UTC plus two hours.
	Duration of the last check	Check duration in hours and minutes. (Only shown when a check has been made.)
	Start of the current check	See “Start of the last check” on page 6-153. (Only shown when a check has been made.)
	Progress of the current check	Only shown when a check is currently active.


CIFS Integrity Monitoring » CIFS Integrity Status » pc-x7-scan
Status
Actions
Possible Actions for pc-x7-scan
Verify the validity of the recent check report
Validate the report
Start an integrity check right now
Start a check
Cancel the currently running integrity check
Cancel
(Re-)Build the integrity database
Perform this, if the checked shares content has been changed intentionally.
Initialize
Please note: This will erase an already existing integrity database.
Cancel the creation of the integrity database
Cancel
Please note: Unless appointed otherwise the creation will be started at the time of the next regular check.
Erase reports and the integrity database
Erase
Please note: Unless appointed otherwise the integrity database will be re-created at the time of the next regular check.

CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Actions		
Possible Actions for ...	**Verify the validity of the recent check report**	By clicking **Validate the report**, a check is made as to whether the report is unchanged from the definition in the mGuard (according to signature and certificate).
	Start an integrity check right now	The integrity check is started by pressing **Start a check**. Only shown when a check is not currently active.
	Cancel the currently running integrity check	The integrity check is stopped by pressing **Cancel**. Only shown when a check is currently active.

CIFS Integrity Monitoring >> CIFS Integrity Status >> Display >> Actions (continued)		
	(Re-)Build the integrity database	The mGuard creates a checksum database in order to check whether the files have changed. A change to executable files indicates a virus infection. However, when these files have been changed intentionally, a new database must be created by pressing **Initialize** in order to prevent false alarms. The creation of an integrity database is also recommended when network drives have been newly set up. Otherwise, an integrity database is set up during the first scheduled check instead of a check being made.
	Cancel the creation of the integrity database **Only shown when a database is currently being created.**	The creation of the integrity database is stopped by pressing **Cancel**. The old database is no longer used. A new database must be created manually, otherwise it is created automatically at the next scheduled check of the drive. The contents of the network drive may be manipulated (e.g. infected) without being detected when no integrity database is in place.
	Erase reports and the integrity database	All reports/databases are deleted by pressing **Erase**. A new integrity database must be created for any further integrity checks. This can be triggered by pressing **Initialize**. Otherwise, a new integrity database is created automatically at the next scheduled check. This procedure cannot be seen.

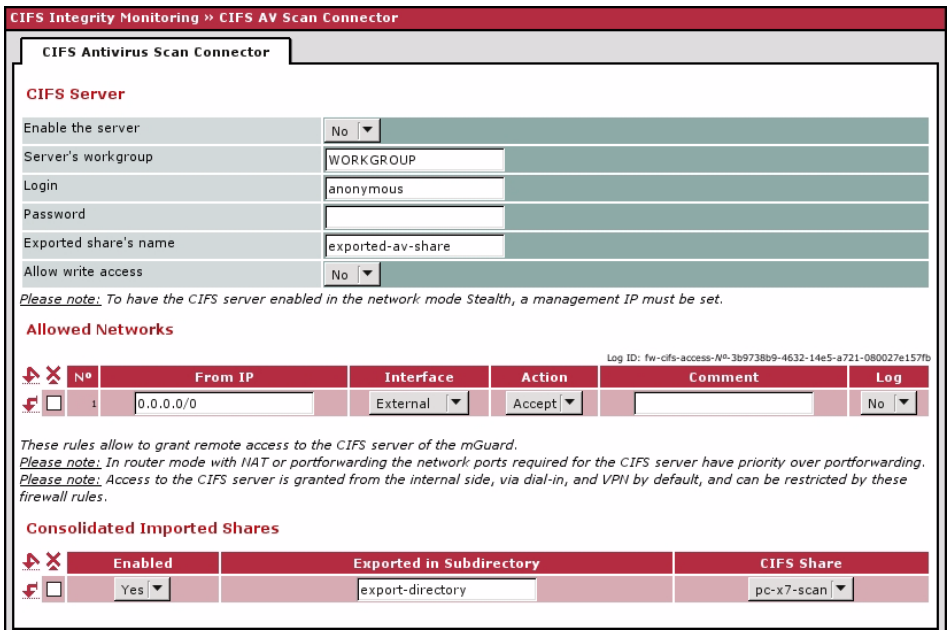
6.7.4 CIFS Integrity Monitoring >> CIFS AV Scan Connector

The CIFS server for the antivirus scan is not supported in Stealth network mode without a management IP address.

CIFS Antivirus Scan Connector

In the **CIFS Antivirus Scan Connector**, the mGuard allows an antivirus scan of drives that are otherwise not externally accessible (e.g. production cells). The mGuard mirrors a drive externally in order to carry out the antivirus scan. Additional antivirus software is necessary in this procedure. Set the necessary read access for your antivirus software.

6.7.4.1 CIFS Antivirus Scan Connector



CIFS Integrity Monitoring >> CIFS Antivirus Scan Connector		
CIFS Server	**Enable the server**	**No:** CIFS server is not available **Yes:** CIFS server is available
	Server's workgroup	Name of the CIFS server workgroup.
	Login	Login for the server.
	Password	Password for the login.
	Exported share's name	Name set for the computers who should use the CIFS server to access the combined drives (the drives are connected under this name).
	Allow write access	**No:** Read access only **Yes:** Read and write access

CIFS Integrity Monitoring >> CIFS Antivirus Scan Connector (continued)

Allowed Networks

These rules allow external access to the CIFS server of the mGuard.

In Router mode with NAT or port forwarding, the port numbers for the CIFS server have priority over the rules for port forwarding (port forwarding is set under “Network >> NAT”).

Access to the CIFS server is allowed from LAN, via dial-in and VPN by default, and can be restricted or expanded via the firewall rules.

A different default setting can also be defined using these rules.

From IP

Enter the address of the system or network where remote access is permitted or forbidden in this field.

IP address: **0.0.0.0/0** means all addresses. To enter an address, use CIDR notation (see 6-213).

Interface

External / **Internal** / **External 2** / **VPN** / **Dial-in**[1]

Specifies which interface the rules apply to.

If no rules are set, or if no rule takes effect, the following default settings apply:

– Remote access is permitted over *Internal, VPN* and *Dial-in*.
– Access over *External* and *External 2* is refused.

Specify the access possibilities according to your requirements.

If you want to refuse access over *Internal, VPN* or *Dial-in*, you must implement this explicitly through corresponding firewall rules, by specifying *Drop* as an action, for example.

Action

Accept means that data packets may pass through.

Reject means that the data packets are rejected. The sender is informed that the data packets have been rejected. In *Stealth* mode, Reject has the same effect as Drop.

Drop means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.

Comment

Freely selectable comment for this rule.

Log

For each rule, you can specify whether the use of the rule

– should be logged (set *Log* to **Yes**) or
– should not be logged (set *Log* to **No** – factory default)

Consolidated Imported Shares

Enabled

No: This network drive is not mirrored.

Yes: This network drive is mirrored and made available.

Exported in Subdirectory

Several drives can be combined into one in this directory.

CIFS Share

Name of the network drive to be imported (created under *CIFS Integrity Monitoring >> Importable Shares >> Edit*).

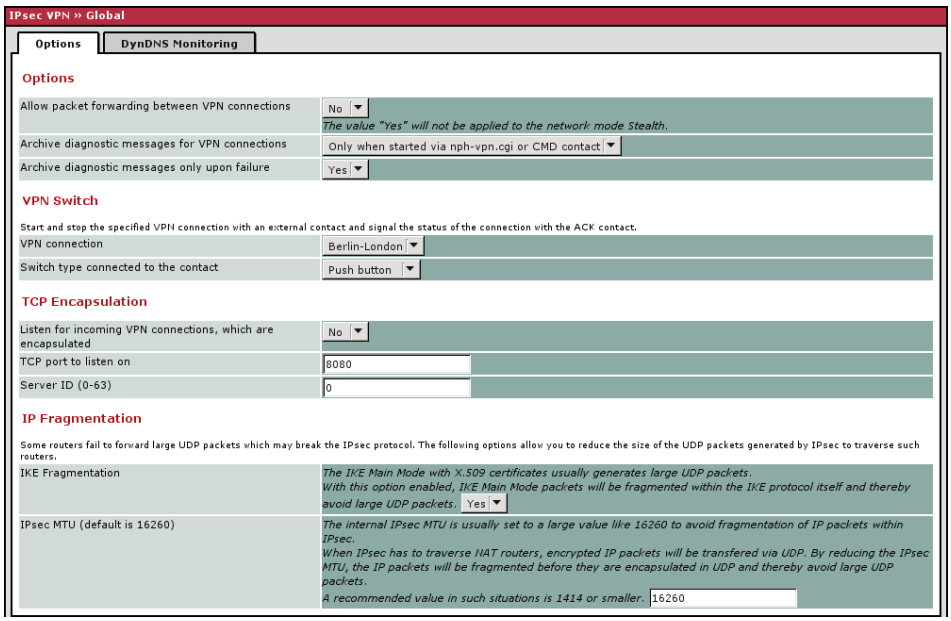
1 *External 2* and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

6.8 IPsec VPN menu

This menu is **not** available on the **mGuard blade controller**.

6.8.1 IPsec VPN >> Global

6.8.1.1 Options


IPsec VPN » Global
Options
DynDNS Monitoring
Options
Allow packet forwarding between VPN connections
No
The value "Yes" will not be applied to the network mode Stealth.
Archive diagnostic messages for VPN connections
Only when started via nph-vpn.cgi or CMD contact
Archive diagnostic messages only upon failure
Yes
VPN Switch
Start and stop the specified VPN connection with an external contact and signal the status of the connection with the ACK contact.
VPN connection
Berlin-London
Switch type connected to the contact
Push button
TCP Encapsulation
Listen for incoming VPN connections, which are encapsulated
No
TCP port to listen on
8080
Server ID (0-63)
0
IP Fragmentation
Some routers fail to forward large UDP packets which may break the IPsec protocol. The following options allow you to reduce the size of the UDP packets generated by IPsec to traverse such routers.
IKE Fragmentation
The IKE Main Mode with X.509 certificates usually generates large UDP packets.
With this option enabled, IKE Main Mode packets will be fragmented within the IKE protocol itself and thereby avoid large UDP packets.
Yes
IPsec MTU (default is 16260)
The internal IPsec MTU is usually set to a large value like 16260 to avoid fragmentation of IP packets within IPsec.
When IPsec has to traverse NAT routers, encrypted IP packets will be transfered via UDP. By reducing the IPsec MTU, the IP packets will be fragmented before they are encapsulated in UDP and thereby avoid large UDP packets.
A recommended value in such situations is 1414 or smaller.
16260

IPsec VPN >> Global >> Options

Options

Allow packet forwarding between VPN connections

The **Yes** setting is only needed for an mGuard communicating between two different VPN remote peers.

The local network of the communicating mGuard must be configured so that the remote networks containing the VPN remote peers are included. This is necessary for the correct communication between two VPN remote peers. The opposite set-up (local and remote network interchanged) must also be established for VPN remote peers (see “Remote” on page 6-171).

The **Yes** setting is not supported in the *Stealth* network mode.

IPsec VPN >> Global >> Options (continued)		
		No (default): VPN connections exist separately. **Yes:** Hub and Spoke feature activated: A control center diverts VPN connections to several branches, who can also communicate with each other. mGuard remote peers can also exchange data between each other during the establishment of such a star VPN connection topology. In this case, we recommend that the local mGuard consults CA certificates for the authentication of remote peers (see “Authentication” on page 6-177).
Only for mGuard industrial RS	**Start and stop the specified VPN connection with the CMD contact...: Off / *VPN connection name***	The mGuard industrial RS has connections where an external pushbutton or on/off switch and a signal LED can be connected. One of the configured VPN connections can be established or released using the pushbutton or the on/off switch. The VPN connection in question is defined here: If VPN connections are defined and listed under the *IPsec VPN >> Connections* menu (see page 6-165), then these are displayed in the selection list. If you want the connection to be established or released manually by pressing the button or using the switch, then you select this here. If starting and stopping the VPN connection via the CMD contact is activated, only the CMD contact is authorized to this. This means that if set to **Enabled** for the overall VPN connection, this has no effect. If a pushbutton is connected to the CMD contact (instead of a switch – see below), the connection can also be established and disabled using the CGI script command nph-vpn.cgi, which has the same rights. When **Off** is selected, this function is disabled. If a pushbutton or on/off switch is connected to the mGuard service contacts, then using it has no effect.

IPsec VPN >> Global >> Options (continued)		
Only for mGuard industrial RS	**Switch type connected to the CMD contact: Pushbutton / On/off switch**	The mGuard industrial RS has connections where an external pushbutton/switch and a signal LED can be connected. Select the switch type that is connected to the corresponding service contacts of the mGuard industrial RS. See also “Installing the mGuard industrial RS” on page 4-9 under **Service Contacts**. How to operate the different switch types is also described there. If a VPN connection is established by operating the pushbutton or switch, the connection remains in place until it is released by operating the pushbutton / switch again. If an on/off switch is used (instead of a pushbutton) and it is operated to establish a VPN connection, this connection is re-established automatically when the mGuard is restarted.
	Archive diagnostic messages for VPN connections: No / Only when started via nph-vpn.cgi (or CMD contact)[1]	If errors occur when setting up VPN connections, the mGuard logging can be used to find the source of the error on the basis of corresponding entries (see *Logging* >> *Browse local logs* menu). This error diagnosis is a standard option. Set this switch to **No** (default) if it is sufficient.

IPsec VPN >> Global >> Options (continued)	
Option	**Only when started via nph-vpn.cgi (or CMD contact):** If the possibility of diagnosing VPN connection problems using the mGuard logging is seen as too impractical or insufficient, select this option. This may be the case if the following conditions apply: – In certain application environments, e.g. when the mGuard is “operated” by machine control via the CMD contact (mGuard industrial RS only), the option for a user to view the log file of the mGuard using the web-based user interface of the mGuard may not be available at all. – If the mGuard is being used locally, it can occur that a VPN connection error can only be diagnosed after the mGuard is temporarily disconnected from its power source – which causes all the log entries to be deleted. – The relevant log entries of the mGuard that could be useful may be deleted because the mGuard regularly deletes older log entries on account of its limited memory space. – If an mGuard is being used as the central VPN remote peer, e.g. in a remote maintenance center as the gateway for the VPN connections of numerous machines, the messages on activities in the various VPN connections are logged in the same data flow. The resulting volume of the logging makes it time-consuming to find the information relevant to one error. After the archiving is enabled, relevant log entries about the operations involved in setting up VPN connections are archived in the permanent memory of the mGuard if the connections are set up as follows: – Via the CMD contact – Via the CGI interface nph-vpn.cgi with the command “synup” (see *Application Note: Diagnosis of VPN connections*). (Application Notes are available in the download area of www.innominate.com.) Archived log entries survive reboots. They can be downloaded as part of the support snapshot (*Support* >> *Advanced* menu, *Snapshot* tab page). A snapshot gives the Innominate-Support additional options to search for and find the causes of problems more efficiently than would be possible without archiving and is used for support purposes. **Archive diagnostic messages only upon failure: Yes / No** — Only visible when archiving is enabled. If only those log entries should be archived that are generated for failed connection attempts, set this switch to **Yes**. With **No**, all log entries are archived.

[1] The CMD contact is only available for the mGuard industrial RS

TCP Encapsulation

This function is used to encapsulate data packets to be transmitted via a VPN connection into TCP packets. Without this encapsulation, it is possible that with VPN connections, important data packets belonging to the VPN connection may not be correctly transmitted due to interconnected NAT routers, firewalls or proxy servers, for example.

For example, firewalls may be set up to stop any data packets of the UDP protocol from passing through or (incorrectly implemented) NAT routers may not manage the port numbers correctly for UDP packets.

TCP encapsulation avoids these problems, because the packets belonging to the relevant VPN connection are encapsulated into TCP packets, i.e. they are hidden so that only TCP packets appear for the network infrastructure.

TCP encapsulation can only be used if an mGuard (from version 6.1) is used on both sides of the VPN tunnel.

TCP encapsulation should only be used if it is necessary, because connections are slowed down by the significant increase in the data packet overhead and by the correspondingly longer processing times.

If the mGuard is configured to use a proxy for HTTP and HTTPS in the “Network >> Proxy Settings” menu, then this proxy is also used for VPN connections that use TCP encapsulation.

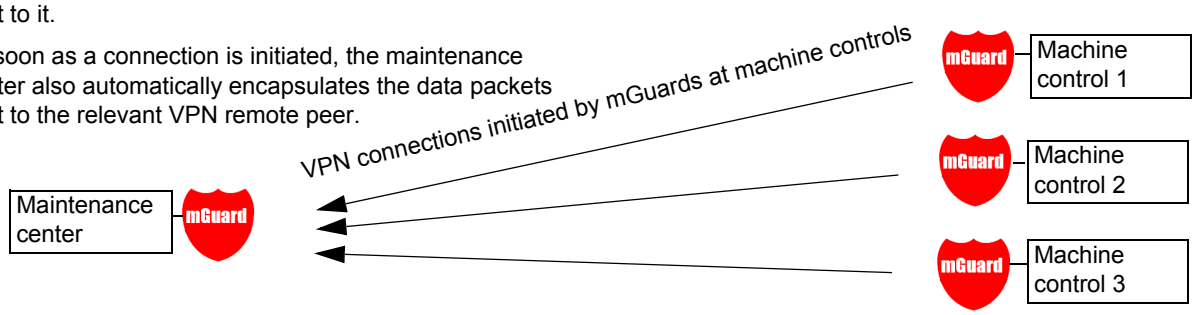
TCP encapsulation supports the *Basic Authentication* and *NTLM* authentication procedures to the proxy.

For the TCP encapsulation to work through a HTTP proxy, the proxy must be named explicitly in the proxy settings (“Network >> Proxy Settings” menu) (i.e. not a transparent proxy) and this proxy must also understand and permit the HTTP method CONNECT.

An mGuard used as a server in order to accept encapsulated VPN connections must not be found behind a NAT router and must have its own IP address (the client also uses this address to establish encapsulated connections).

As participants in the TCP encapsulation, the mGuards for the machine controls initiate the VPN data traffic to the maintenance center and encapsulate the data packets sent to it.

As soon as a connection is initiated, the maintenance center also automatically encapsulates the data packets sent to the relevant VPN remote peer.



mGuard of maintenance center

Required basic settings

– **IPsec VPN** *menu, Global*, *Options* tab:
  Listen for incoming VPN connections, which are encapsulated: **YES**
– Submenu: *Connections*, *General* tab:
  Address of the remote site's VPN gateway: **%any**
  Connection startup: **Wait**

mGuards at machine controls

Required basic settings

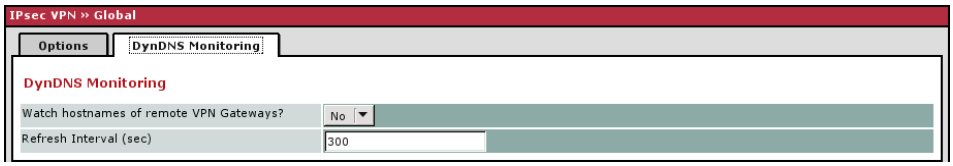
– **IPsec VPN** menu, *Global, Options* tab:
  Listen for incoming VPN connections, which are encapsulated: **NO**
– Submenu: *Connections, General* tab:
  Address of the remote site's VPN gateway: Fixed IP address or hostname
  Connection startup: **Initiate** or **Initiate on traffic**
  Encapsulate the VPN traffic in TCP: **YES**

Fig. 6-3 TCP encapsulation in an application scenario with a maintenance center and machines maintained remotely via VPN connections

IPsec VPN >> Global >> Options		
TCP Encapsulation	**Listen for incoming VPN connections, which are encapsulated**	Default setting: **No**. Only set to **Yes** if the TCP Encapsulation function is being used. Only then can the mGuard accept connection setups with encapsulated packets.
	TCP port to listen on	Number of the TCP port where the encapsulated data packets to be received come in. The port number entered here must be the same as the one entered at the remote peer's mGuard as **TCP Port of the server, which accepts the encapsulated connection** (*IPsec VPN >> Connections* menu, Edit, *General* tab page). The following restrictions apply: – The port to listen on must not be identical to a port that is being used for remote access (SSH, HTTPS or SEC-Stick).

IPsec VPN >> Global >> Options (continued)		
	Server ID (0-63)	The default value **0** usually does not have to be changed. The numbers are used to differentiate different centers. A different number only has to be used in the following case: An mGuard installed before a machine must make connections to two or more different maintenance centers and their mGuards with TCP encapsulation activated.
IP Fragmentation	**IKE Fragmentation**	UDP packages can be oversized if an IPsec connection is made between the participants, including the exchange of certificates. Some routers are not capable of forwarding large UDP packages if they are fragmented during the transfer process (e.g. by DSL in 1500 byte segments). Some defective devices forward the first fragment only, leading to a connection failure. If two mGuards communicate with each other, then the dispatch of small UDP packages should be agreed upon first. This prevents packages from being fragmented during transportation, which may lead to incorrect transfer from certain routers. If you want to use this option, set it to **Yes**. If **Yes** is selected, the setting only comes into effect if the remote peer is an mGuard with installed firmware above version 5.1.0. In all other cases, the setting has no effect (also no negative effects).
	IPsec MTU (default is 16260)	The methods for avoiding oversized IKE data packages (incorrect transfer) can also be applied for IPsec data packages. In order to remain below the upper limit set by DSL (1500 bytes), we recommend setting a value of 1414 (bytes). This also allows enough space for additional headers. If you want to use this option, enter a value lower than the default setting.

6.8.1.2 DynDNS Monitoring



For an explanation of DynDNS, see “DynDNS” on page 6-102.

IPsec VPN >> Global >> Options		
DynDNS Monitoring	**Watch hostnames of remote VPN Gateways?**	**Yes / No** If the mGuard has been given the address of the remote VPN gateway as a hostname (see “Defining VPN connection / VPN connection channels” on page 6-167) and this hostname is registered with a DynDNS Service, then the mGuard can check the DynDNS at regular intervals for whether any changes have occurred. If so, the VPN connection will be setup to the new IP address.
	Refresh Interval (sec)	Default: 300

6.8.2 IPsec VPN >> Connections

Requirements for a VPN connection:

The main requirement for a VPN connection is that the IP addresses of the VPN partners are known and accessible.

- In order for an IPsec connection to be setup successfully, the VPN remote peer must support IPsec with the following configuration:
  - Authentication via Pre-Shared Key (PSK) or X.509 certificate
  - ESP
  - Diffie-Hellman Groups 2 and 5
  - DES, 3DES or AES encryption
  - MD5 or SHA-1 hash algorithms
  - Tunnel or Transport Mode
  - Quick Mode
  - Main Mode
  - SA Lifetime (1 second to 24 hours)

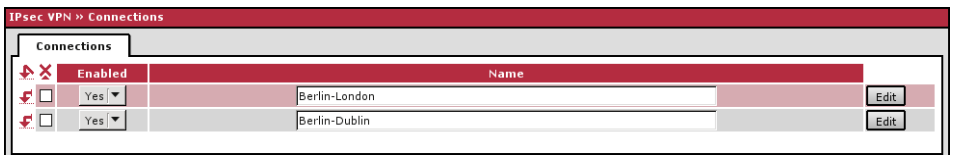
  If the remote peer system is running Windows 2000, the *Microsoft Windows 2000 High Encryption Pack* or at least *Service Pack 2* must be installed.
- If the remote peer is behind a NAT router, the peer must support NAT-T. Alternatively, the NAT router must support the IPsec protocol (IPsec/VPN Passthrough). For technical reasons only IPsec Tunnel connections are supported in both cases.

6.8.2.1 Connections

Lists the VPN connections that have been defined.

Each entry listed here can identify an individual VPN connection or a group of VPN connection channels. You have the possibility of defining several tunnels under the transport or tunnel settings of the respective entry.

You also have the possibility of defining, activating and deactivating new VPN connections, changing (editing) the VPN or connection group settings and deleting connections.



6.8.3 Making a new definition of VPN connection / VPN connection channels:

- Click on the **Edit** button on the connection table under the “(unnamed)” entry.
- If the “(unnamed)” entry cannot be seen, then open a further line in the table.

Editing VPN connection / VPN connection channels:

- Click on the **Edit** button to the right of the entry.

URL for starting, stopping and status query of a VPN connection

The following URL can be used to start and stop VPN connections and query the connection status, independently from their **Enabled** setting:

`https://`*`server`*`/nph-vpn.cgi?name=`*`connection`*`&cmd=(up|down|status)`

Example:

```
wget https://admin:mGuard@192.168.1.1/nph-vpn.cgi?name=Athen&cmd=up
```

A command like this relates to all connection channels that are summarized under the respective name (in this example, *Athen*). This is the name entered under “A descriptive name for the connection” on the *General* tab page. If ambiguity occurs, then the URL call only affects the first entry in the connections list.

Access to individual VPN connection channels is not possible. If individual channels are deactivated (**Enabled:** No), then these are not started. Starting and stopping in this way thus have no effect on the settings of the individual channels (i.e. the list under *Transport and Tunnel Settings*).

Starting and stopping a connection using a URL only makes sense if the configuration of the connection is deactivated (**Enabled:** No) or when **Connection startup** is set to “Wait”. Otherwise, the connection to the mGuard is established independently.

If the status of a VPN connection is queried using the URL detailed above, then the following answers can be expected:

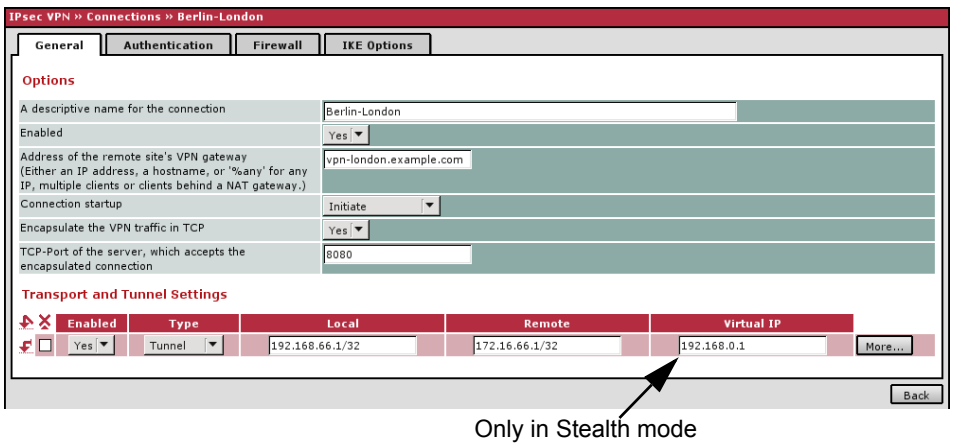
Table 6-1 Status of a VPN connection

Answer	Meaning
`unknown`	A VPN connection with this name does not exist.
`void`	The connection is inactive due to an error (e.g. the external network is down or the hostname of the remote peer could not be released in an IP address (DNS)).
`ready`	The connection is ready to establish channels or allow incoming queries regarding channel set-up.
`active`	At least one channel is set-up for the connection.

Defining VPN connection / VPN connection channels

Depending on the mGuard network mode, the following page appears after clicking **Edit**.

6.8.3.1 General



IPsec VPN >> Connections >> Edit >> General		
Options	**A descriptive name for the connection**	You can name or rename the connection as desired. If several connection channels are defined below under *Transport and Tunnel Settings*, then this name applies to the whole set of VPN connection channels summarized under this name. Similarities between VPN connection channels: – Same authentication procedure, as defined under the *Authentication* tab page (see “Authentication” on page 6-177) – Same firewall settings – Same IKE option settings
	Enabled	**Yes / No** Defines whether the VPN connection channels should be completely active (Yes) or not (No).
	Address of the remote site’s VPN gateway	An IP address, hostname or **%any** for several remote peers or remote peers behind a NAT router.

Address of the remote site's VPN gateway

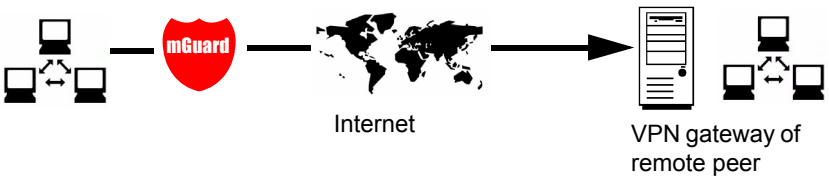


Fig. 6-4 The address of the gateway to the private network where the remote communication partner can be found.

– If the mGuard should actively initiate and set up the connection to the remote peer, enter the IP address or the hostname of the remote peer here.
– If the remote peer VPN gateway does not have a fixed and known IP address, you can use the DynDNS Service (see glossary) to simulate a fixed and known address.
– If the mGuard should be ready to accept a connection that was actively initiated and set up by a remote peer with any IP address, enter: **%any**.

  This setting should also be selected for VPN star configurations when the mGuard is connected to the control center.

  The mGuard can then be “called” by a remote peer if this remote peer has been dynamically assigned its IP address by the ISP (i.e. it has a changeable IP address). In this scenario, you may only enter an IP address when the remote peer has a fixed and known IP address.

%any can only be used along with the authentication procedure using X.509 certificates.

If locally stored CA certificates are to be used to authenticate the remote peer, the address of the remote peer's VPN gateway can be entered explicitly (via IP address or hostname) or via **%any**. If it is entered using an explicit address (and not with “%any”), then a VPN identifier (see “VPN Identifier” on page 6-180) must be specified.

%any must be selected when the remote peer is located behind a NAT gateway. Otherwise the renegotiation of new connection keys will fail after the connection is established.

If **TCP Encapsulation** is used (see “TCP Encapsulation” on page 6-161):
A fixed IP address or a hostname must be entered if this mGuard is to initiate the VPN connection and encapsulate the VPN data traffic.

If this mGuard is installed before a maintenance center to which multiple remote mGuards set up VPN connections and send encapsulated data packets, the remote site's VPN gateway must be entered as **%any**.

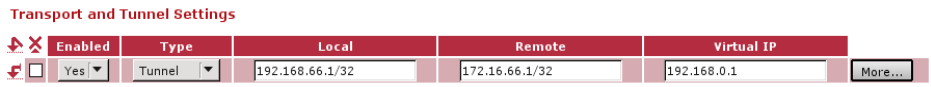
IPsec VPN >> Connections >> Edit >> General		
Options	**Connection startup: Initiate / Initiate on traffic / Wait**	**Initiate** The mGuard initiates the connection to the remote peer. In the *Address of the remote site's VPN gateway* (see above), the fixed IP address of the remote peer, or its name, must be entered. **Initiate during data traffic** The connection is initiated automatically when the mGuard sees that the connection should be used (can be selected in all operating modes of the mGuard (*Stealth, Router* etc.)). **Wait** The mGuard is ready to accept connections which a remote peer actively initiates and sets up to the mGuard. When **%any** is entered under *Address of the remote site's VPN gateway*, then **Wait** must be selected.
	Encapsulate the VPN traffic in TCP	**Yes / No** Default: **No** If the **TCP Encapsulation** function is used (see "TCP Encapsulation" on page 6-161), only set this switch to **Yes** if the mGuard is to encapsulate its own outgoing data traffic for the VPN connection it initiated itself. In this case, the number of the port where the remote peer receives the encapsulated data packets must also be entered.
	TCP-Port of the server, which accepts the encapsulated connection	Default: **8080**. Number of the port where the remote peer receives the encapsulated data packets. The port number entered here must be the same as the one entered at the remote peer's mGuard as **TCP port to listen on** (*IPsec VPN >> Global >> Options* menu). **If TCP Encapsulation is used (see "TCP Encapsulation" on page 6-161):** – If the mGuard is to set up a VPN connection to a maintenance center and encapsulate the traffic to there: – **Initiate** or **Initiate on traffic** must be entered. – If the mGuard is installed at a maintenance center to which mGuards are setting up a VPN connection: – **Wait** must be entered.

IPsec VPN >> Connections >> Edit >> General (continued)

Transport and Tunnel Settings

Click here when further tunnel or transport paths should be specified.

Stealth mode:



Router mode:

VPN connection channels

A VPN connection defined under a descriptive name can consist of more than one VPN connection channel. Therefore you can define multiple VPN connection channels here.

For each individual VPN connection channel

After the **More...** button is clicked, another partially overlapping page is displayed where connection parameters can be defined for the relevant transport path or tunnel.

Enabled

Yes / No

You specify whether the connection channel should be active (Yes) or not (No).

Comment

Freely selectable comments. Can be left empty.

Type

The following can be selected:

– Tunnel (Network ↔ Network)
– Transport (Host ↔ Host)

Tunnel (Network ↔ Network)

This connection type is suitable in all cases and is also the most secure. In this mode, the IP datagrams are completely encrypted with a new header and sent to the remote peer VPN gateway – the “tunnel end”. The transferred datagrams are then decrypted and the original datagrams are restored. These are then forwarded to the destination system.

Transport (Host ↔ Host)

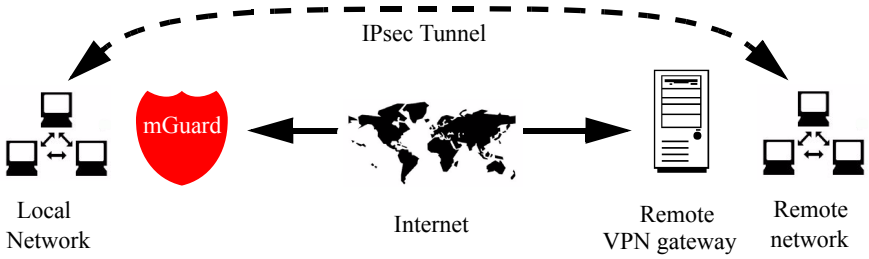
In this type of connection, the device only encrypts the data of the IP packets. The IP header information remains unencrypted.

When a change to *Transport* is made, the following fields (apart from the protocol) are hidden as these parameters are omitted.

IPsec VPN >> Connections >> Edit >> General (continued)

Local / remote – for connection type ***Tunnel*** **(Network ↔ Network)**

Define the network areas for both tunnel ends under **Local** and **Remote**.



Local

Enter the network or computer address where the local mGuard is connected.

Remote

Enter the network or computer address found behind the remote VPN gateway here.

If the *Address of the remote site's VPN gateway* (see "Address of the remote site's VPN gateway" on page 6-167) is entered as **%any**, it is possible that a number of different remote peers will connect to the mGuard.

Default route over the VPN:

The address 0.0.0.0/0 provides a *Default route over the VPN*.

In this case, all data traffic where no other tunnel or route exists is forwarded through this VPN tunnel.

A default route over the VPN should only be given for a single tunnel.

Default route over the VPN cannot be used in *Stealth* mode.

Options following installation of a VPN tunnel group license

If the *Address of the remote site's VPN gateway* is entered as **%any**, it is possible that there are many mGuards or many networks on the remote side.

A very large address range is then specified in the **Remote** field for the local mGuard. A part of this address range is used on the remote mGuards for the network entered for each of them under **Local**.

This is illustrated as follows: The entries in the *Local* and *Remote* fields for the local and remote mGuards could be made as follows:

Local mGuard			Remote mGuard **A**	
Local	Remote		Local	Remote
10.0.0.0/8	10.0.0.0/8	>	10.1.7.0/24	10.0.0.0/8
			Remote mGuard **B**	
			Local	Remote
		>	10.3.9.0/24	10.0.0.0/8
			etc.	

In this way, configuring a single tunnel can allow you to establish connections for a number of peers.

To use this option, the *VPN tunnel group license* must be installed, unless the device was delivered accordingly. The system must be rebooted in order to use this installed license.

Virtual IP *(only in Stealth mode)*

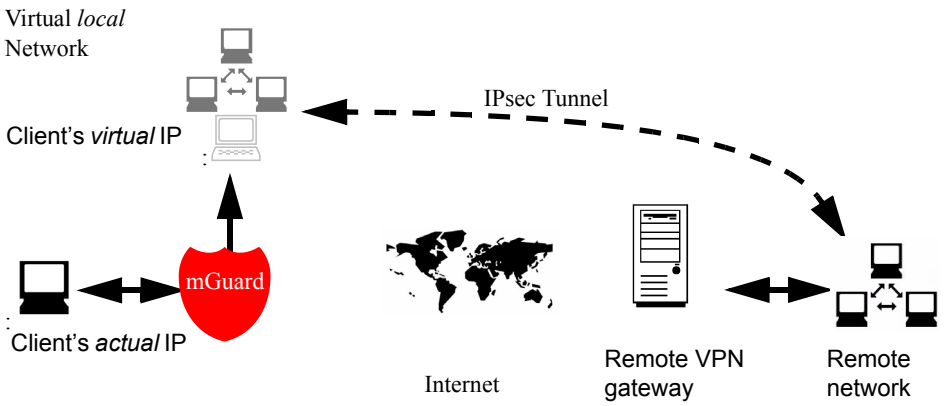


Fig. 6-5 Virtual IP

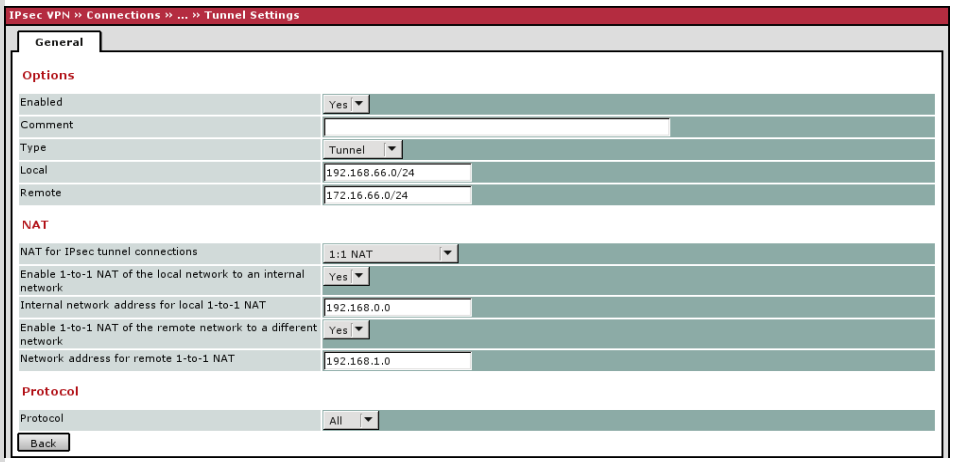
In *Stealth* mode, the VPN local network is simulated by the mGuard. Within this *virtual* network, the client is known and accessible under the *virtual* IP address entered here.

IPsec VPN >> Connections >> Edit >> General

Further settings can be made by clicking **More...**

Options

Connection type *Tunnel*



Enabled — **Yes / No**

As above.

Comment — Freely selectable comments. Can be left empty.

Type — Tunnel / Transport

As above. When a change to *Transport* is made, the following fields (apart from *Protocol*) are hidden as these parameters are omitted.

Local — See “Local” on page 6-171.

Remote — See “Remote” on page 6-171.

Virtual IP for the client — See “Virtual IP for the client” on page 6-173.

NAT

NAT for IPsec tunnel connections — **Off / Local masquerading / 1:1 NAT**

Default: **Off**

Local masquerading

Can only be used for the *Tunnel* VPN type.

Example

A control center has one VPN tunnel each for a large number of branches. One local network with numerous computers is installed in each of the branches, and these computers are connected to the control center via the respective VPN tunnel. In this case, the address space could be too small to include all the computers at the various VPN tunnel ends.

However, *Local masquerading* is helpful here:

The computers connected in the network of a branch appear under a single IP address through the local masquerading for the control center’s VPN gateway. In addition, this enables the local networks in the different branches to all use the same network address locally. Only the branch can make VPN connections to the control center.

Internal network address for local masquerading

Specifies the network, i.e. the IP address range, for which the local masquerading is used.

The source address in the data packets sent by this computer via the VPN connection is only replaced by the address entered in the **Local** field (see above) when a computer has an IP address from this range.

The address entered in the **Local** field must have the netmask /32 so that this signifies exactly one IP address.

Local Masquerading can be used in the following network modes: Router, PPPoE, PPTP, Modem, Built-in Modem and Stealth (only “multiple clients” Stealth mode).

Modem / Built-in Modem: Not available on all mGuard models (see “Network >> Interfaces” on page 6-55).

For IP connections via a VPN connection with active local masquerading, the firewall rules for outgoing data in the VPN connection in the VPN connection are used for the original source address of the connection.

1:1 NAT

Only in Router mode.

With 1:1 NAT, it is still possible to enter the used network addresses (local and/or remote) for specifying the tunnel beginning and end, independently of the tunnel parameters agreed with the remote peer:

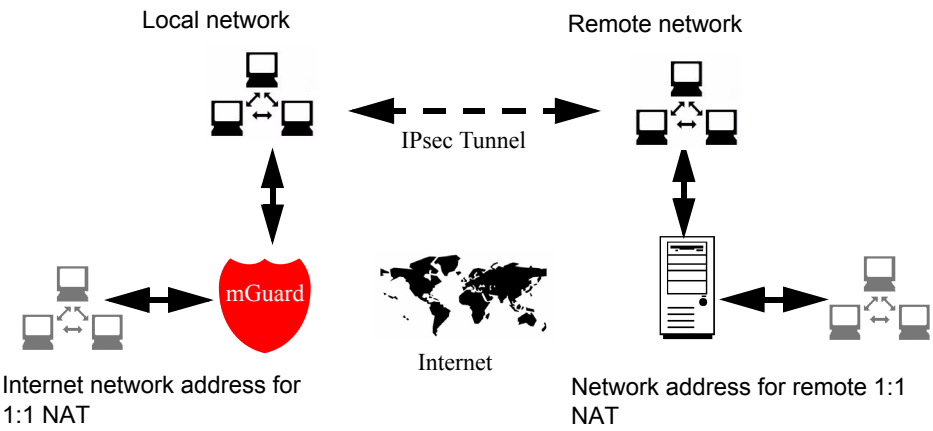


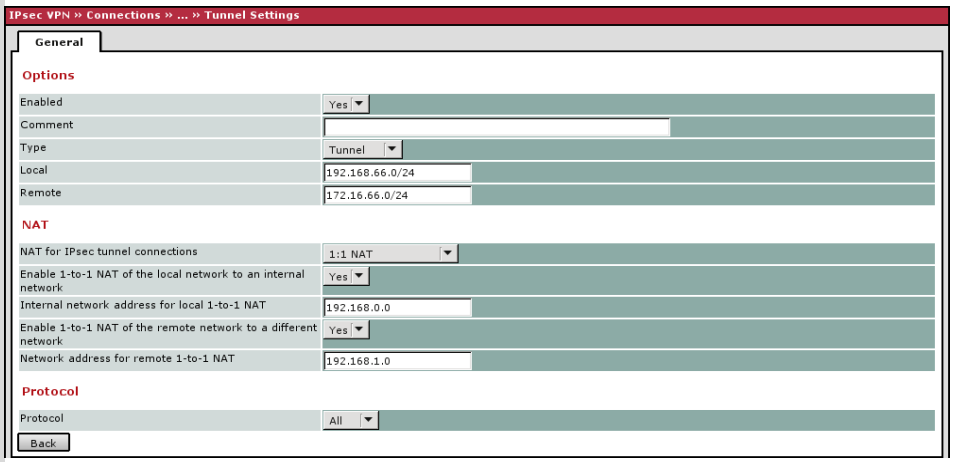
Fig. 6-6 1:1 NAT

IPsec VPN >> Connections >> Edit >> General

Further settings can be made by clicking **More...**

Options

Connection type *Tunnel*



NAT

Enable 1-to-1 NAT of the local network to an internal network

Yes / No

Rewrites the local network specified under *Local* to an existing local network.
The default setting is **No**.

Internal network address for local 1-to-1 NAT

(Only when **Yes** is selected above)

The actual network address of the system in the local network.
The netmask is taken from the **Local** field.

Enable 1-to-1 NAT of the remote network to a different network

Rewrites the remote network agreed by the VPN remote peer under *Remote* as if the computers connected there with their addresses were located in another network.

The default setting is **No**.

Network address for remote 1-to-1 NAT

(Only when **Yes** is selected above)

The remote network address actually addressed by the systems in the local network.
The netmask is taken from the *Remote* field.

If the *remote network* or the *remote network for 1-to-1 NAT* are within one of the networks directly connected to the mGuard LAN port, then the mGuard will additionally answer ARP requests for IP addresses within the remote network. This allows access to a remote VPN using local IP addresses without changing the routing of locally connected clients.

IPsec VPN >> Connections >> Edit >> General (continued)

Further settings can be made by clicking **More...**

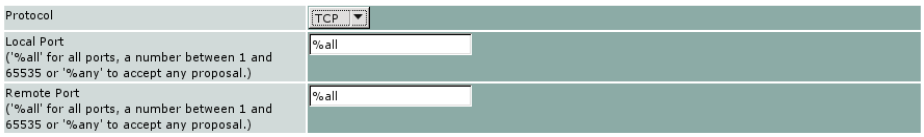
Protocol

Protocol

All / TCP / UDP / ICMP

Select whether the VPN is restricted to a certain protocol or it is valid for all data traffic.

TCP or UDP:


Protocol
TCP
Local Port
('%all' for all ports, a number between 1 and 65535 or '%any' to accept any proposal.)
%all
Remote Port
('%all' for all ports, a number between 1 and 65535 or '%any' to accept any proposal.)
%all

Local Port

%all (default) specifies that all ports can be used. If a specific port should be used, then enter the port number. **%any** specifies that port selection is made by the client.

Remote Port

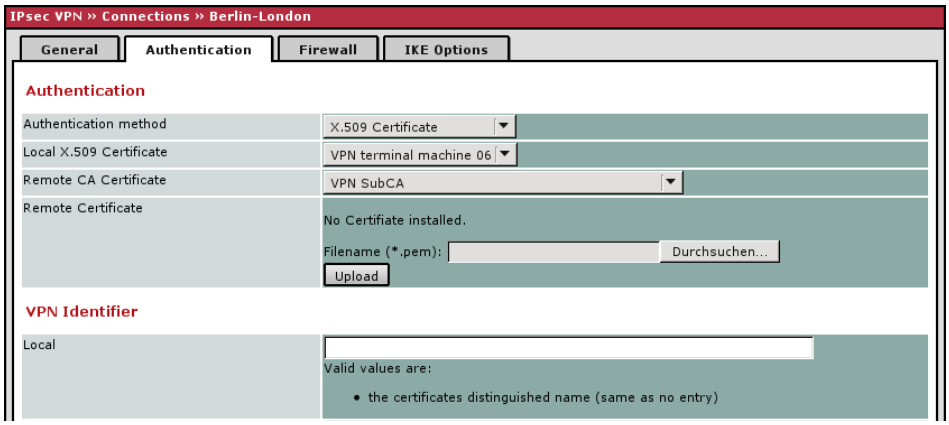
%all (default) specifies that all ports can be used. If a specific port should be used, then enter the port number.

Tunnel settings IPsec / L2TP

If clients should connect to the mGuard by IPsec / L2TP, then activate the L2TP server and make the following entries in the fields specified below:

– **Type:** Transport
– **Protocol:** UDP
– **Local Port:** %all
– **Remote Port:** %all

6.8.3.2 Authentication



IPsec VPN >> Connections >> Edit >> Authentication

Authentication

Authentication method

The following two possibilities are available:

– X.509 Certificate (default)

– Pre-Shared Secret (PSK)

Depending on the chosen option, the page has different setting possibilities.

Authentication method: X.509 Certificate

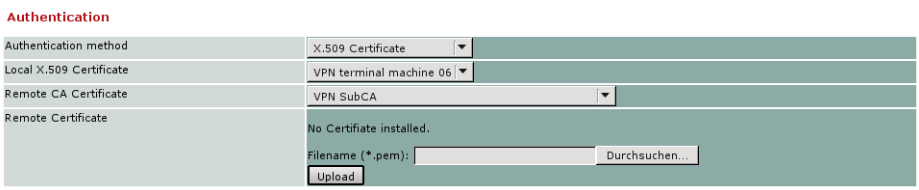
This method is supported by most modern IPsec implementations. Each VPN participant possesses a secret private key, plus a public key in the form of an X.509 certificate. This contains further information on the owner and Certificate Authority (CA).

The following aspects must be defined:

– How the mGuard authenticates itself to the remote peer

– How the mGuard authenticates the remote peer

How the mGuard authenticates itself to the remote peer



IPsec VPN >> Connections >> Edit >> Authentication

Local X.509 Certificate

Defines which machine certificate the mGuard uses as authentication to the VPN remote peer.

Select one of the machine certificates from the selection list.

The selection list gives a selection of machine certificates that are loaded in the mGuard under the *Authentication* >> *Certificates* menu (see page 6-113).

If *None* is displayed, then a certificate must be installed first. The *None* entry must not be left in place, as this results in no X.509 authentication.

How the mGuard authenticates the remote peer

The following definition relates to how the mGuard verifies the authentication of the VPN remote peer.

The table below shows which certificates must be provided for the mGuard to authenticate the VPN remote peer if the peer displays one of the following certificate types on connection:

– A machine certificate signed by a CA
– A self-signed machine certificate

For further information on the following table see chapter “Authentication >> Certificates” on page 6-113.

Authentication for VPN

The remote peer shows the following:	Machine certificate **signed by CA**	Machine certificate **self-signed**
The mGuard authenticates the remote peer using:	⇕	⇕
	Remote certificate All CA certificates that build the chain to the root CA certificate together with the certificates displayed by the remote peer	Remote certificate

According to this table, certificates must be provided that the mGuard has to use for authentication of the respective VPN remote peer.

Requirement

The following instructions assume that the certificates have already been correctly installed in the mGuard (see “Authentication >> Certificates” on page 6-113; apart from the remote certificate).

If the use of block lists (CRL checking) is activated under the *Authentication* >> *Certificates, Certificate settings* menu, then each certificate signed by a CA that an VPN remote peer presents is checked for blocks. Locally configured remote certificates (imported here) are excepted.

Remote CA Certificate

Self-signed machine certificate

When the VPN remote peer authenticates itself with a **self-signed** machine certificate:

- Select the following entry from the list:
  "No CA certificate, but the Remote Certificate below"
- Install the remote certificate under *Remote Certificate* (see "Installing the remote certificate" on page 6-179).

It is not possible to refer to a remote certificate loaded in the *Authentication >> Certificates* menu.

Machine certificate signed by the CA

When the VPN remote peer authenticates itself with a machine certificate **signed by a CA**:

It is possible to authenticate the machine certificate shown by the remote peer as follows:

– Using a CA certificate
– Using the corresponding remote certificate

Using a CA certificate:

Only the CA certificate from the CA that signed the certificate shown by the VPN remote peer should be referred to here (selection from list). The additional CA certificates that build the chain to the root CA certificate together with the certificate shown by the remote peer must be installed in the mGuard under *Authentication >> Certificates*.

The selection list shows all CA certificates that were loaded in the mGuard under the *Authentication >> Certificates* menu.

The other option is "*Signed by any trusted CA*".

With this setting, all VPN remote peers are accepted, providing that they log on with a certificate signed by a recognized Certificate Authority (CA). The CA is recognized when the relevant CA certificate and all other CA certificates are stored in the mGuard. These then build the chain to the root certificate together with the certificates shown.

Using the corresponding remote certificate:

- Select the following entry from the list:
  "No CA certificate, but the Remote Certificate below"
- Install the remote certificate under *Remote Certificate* (see "Installing the remote certificate" on page 6-179).

It is not possible to refer to a remote certificate loaded in the *Authentication >> Certificates* menu.

Installing the remote certificate

The remote certificate must be configured if the VPN remote peer should be authenticated using a remote certificate.

To import a certificate, please proceed as follows:

Requirement: The certificate file (file format = *.pem, *.cer or *.crt) is saved on the connected computer.

- Click on **Browse...** to select the file.
- Click on **Upload**.
  The certificate contents are then displayed.

IPsec VPN >> Connections >> Edit >> Authentication

VPN Identifier

Authentication method: CA certificate

The following explanation applies when authentication of the VPN remote peer is made using CA certificates.

VPN gateways use the VPN Identifier to recognize which configurations belong to the same VPN connection.

If the mGuard consults CA certificates to authenticate a VPN remote peer, then it is possible to use the VPN Identifier as a filter.

- Make a corresponding entry in the *Remote* field.

Local Default: Empty

You can specify the name that the mGuard uses to identify itself to the remote peer using the VPN Identifier. This must match the entries in the mGuard machine certificate.

Valid entries are:

– Empty (i.e. no entry) (standard). The subject entry of the machine certificate (earlier known as *Distinguished Name*) is then used.
– The subject in the machine certificate.
– One of the *Subject Alternative Names* listed in the certificate. When the certificate contains *Subject Alternative Names*, these are entered under “Valid values are”: These can be IP addresses, hostnames with preset @-signs or e-mail addresses.

Remote Defines what must be entered as a subject in the VPN remote peer machine certificate for the mGuard to accept this VPN remote peer as a communication partner.

It is then possible to limit or release access by VPN remote peers that would accept the mGuard in principle based on the certification check:

– Limitation to certain *subjects* (i.e. machines) or to *subjects* that have certain attributes
– Release for all *subjects*

(see “Subject, certificate” on page 8-5).

“Subject” was previously known as “Distinguished Name”.

IPsec VPN >> Connections >> Edit >> Authentication (continued)

Release for all subjects:

If the *Remote* field is left empty, then any subject entries are allowed in the machine certificate displayed by the VPN remote peer. It is then no longer necessary to identify or define the subject in the certificate.

Limitation to certain subjects:

In the certificate, the certificate owner is entered in the *Subject* field. The entry is comprised of several attributes. These attributes are either expressed as an Object Identifier (e.g.: 132.3.7.32.1) or, more commonly, as an abbreviation with a relevant value.
Example: CN=VPN end point 01, O=Smith and Co., C=UK

If certain subject attributes are to have very specific values so that the VPN remote peer is accepted by the mGuard, then these must be specified accordingly. The values of the other freely selectable attributes are entered using the * wildcard.
Example: CN=*, O=Smith and Co., C=UK
(with or without spaces between attributes)

In this example, the attribute (C=UK and O=Smith and Co.) must be entered in the certificate under “subject”. Only then does the mGuard accept the certificate owner (= subject) as a communication partner. The other attributes in the certificates to be filtered can have freely selectable values.

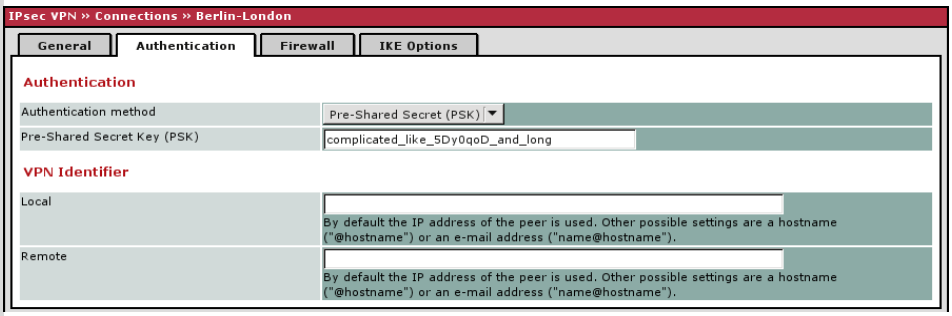
If a subject filter is set, the number **and** sequence of the entered attributes must correspond to those of the certificates where the filter is used.

Pay attention to capitalization.

IPsec VPN >> Connections >> Edit >> Authentication (continued)

VPN Identifier

Authentication method: Pre-Shared Secret (PSK)


IPsec VPN » Connections » Berlin-London
General
Authentication
Firewall
IKE Options
Authentication
Authentication method
Pre-Shared Secret (PSK)
Pre-Shared Secret Key (PSK)
complicated_like_5Dy0qoD_and_long
VPN Identifier
Local
By default the IP address of the peer is used. Other possible settings are a hostname ("@hostname") or an e-mail address ("name@hostname").
Remote
By default the IP address of the peer is used. Other possible settings are a hostname ("@hostname") or an e-mail address ("name@hostname").

This method is mainly used by older IPsec implementations. In this case both sides of the VPN authenticate themselves with the same PSK.

To make the agreed key available to the mGuard, proceed as follows:

- Enter the agreed character string in the **Pre-Shared Secret Key (PSK)** entry field.

To achieve security comparable to that of 3DES, the string should consist of about 30 randomly selected characters, and should include upper and lower case characters and digits.

Pre-Shared Secret Key cannot be used with dynamic (%any) IP addresses. Only fixed IP addresses or hostnames at both ends are supported. However, changing IP addresses (DynDNS) can be hidden behind the hostnames.

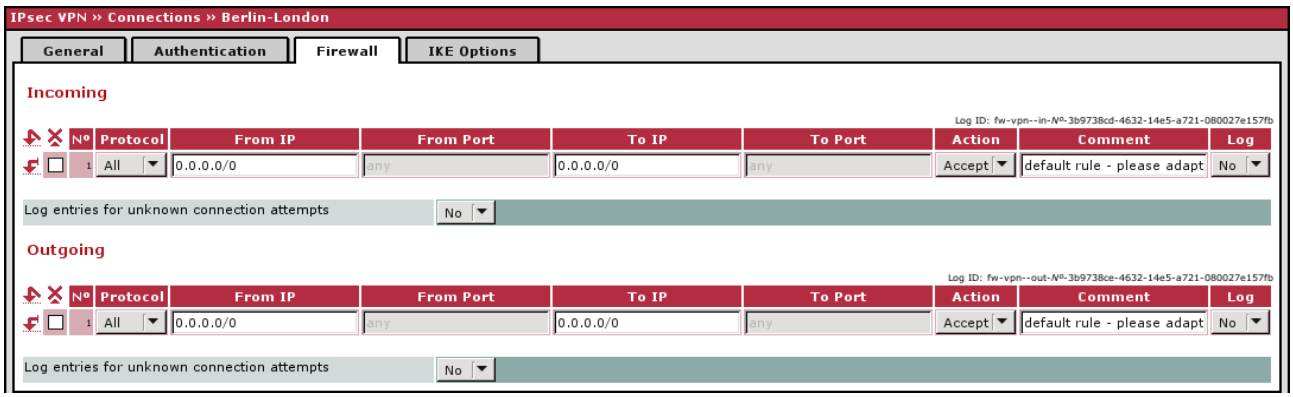
Pre-Shared Secret Key cannot be used if at least one (or both) of the communication partners is located behind a NAT gateway.

VPN gateways use the *VPN Identifier* to recognize which configurations belong to the same VPN connection.

The following entries are valid for PSK:

– Empty (IP address used as default)
– An IP address
– A hostname with a prefixed ‘@’ symbol (e.g. “@vpn1138.example.com”)
– An e-mail address (e.g. “piepiorra@example.com”)

6.8.3.3 Firewall



Incoming / Outgoing

While the settings made in the *Network Security* menu only affect non-VPN connections (see above under “Network Security menu” on page 6-127), the settings here only affect the VPN connection defined on these tab pages.

if multiple VPN connections are defined, you can restrict the outgoing or incoming access individually for each connection. You can log any attempts made to bypass these restrictions.

The VPN firewall factory defaults are set to allow all connections via this VPN connection.

However, the extended firewall settings defined above (see “Network Security menu” on page 6-127, “Network Security >> Packet Filter” on page 6-127, “Advanced ” on page 6-135) apply independently for each individual VPN connection.

If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

In *Stealth* mode, the actual IP address used by the client should be used in the firewall rules, or it should be left at 0.0.0.0/0 (only one client can be addressed through the tunnel).

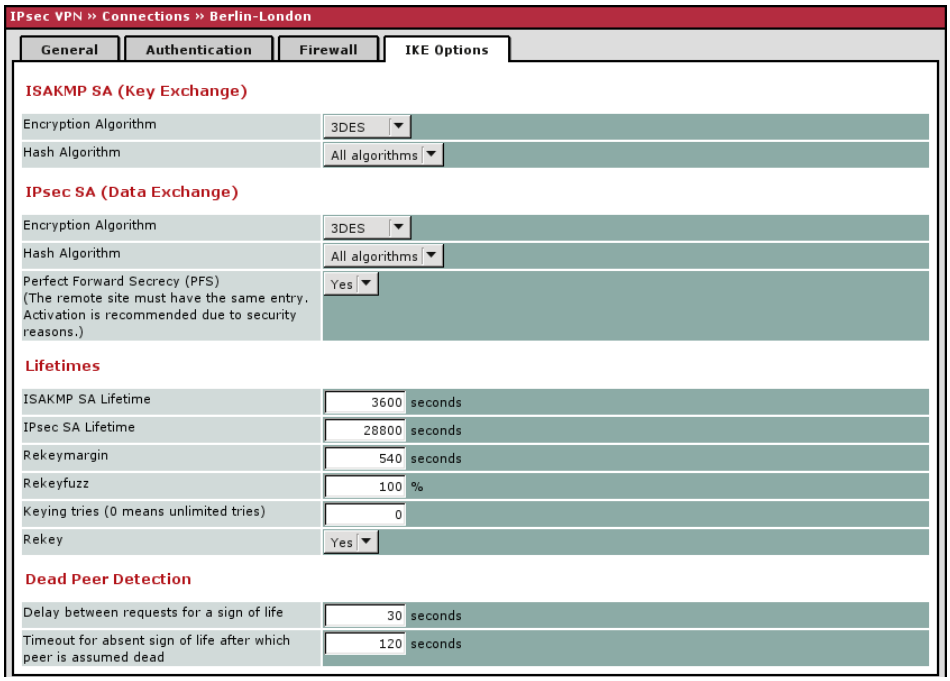
On the *Global* tab page, if the *Allow packet forwarding between VPN connections* switch is set to **Yes**, the rules under **Incoming** will be applied to the data packets coming into the mGuard, and the rules under **Outgoing** will be applied to the data packets going out.

If the outgoing data packets are included in the same connection definition (in a defined VPN connection group), then the firewall rules for **Incoming** and **Outgoing** for the same connection definition are used.

If a different VPN connection definition applies to the outgoing data packets, then the firewall rules for **Outgoing** for this other connection definition are used.

IPsec VPN >> Connections >> Edit >> Firewall		
Incoming	**Protocol**	**All** means: TCP, UDP, ICMP and other IP protocols.
	From / To IP	**0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213). **Incoming**: – From IP: The IP address in the VPN tunnel – To IP: The 1:1 NAT address or actual address **Outgoing**: – From IP: The 1:1 NAT address or actual address – To IP: The IP address in the VPN tunnel
	From Port / To Port	(Only evaluated for TCP and UDP protocols) – **any** describes any selected port. – **startport:endport** (e.g. 110:120) defines a range of ports. You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).
	Action	**Accept** means that data packets may pass through. **Reject** means that the data packets are rejected. The sender is informed that the data packets have been rejected. In *Stealth* mode, Reject has the same effect as Drop. **Drop** means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.
	Comment	Freely selectable comment for this rule.
	Log	For each individual firewall rule, you can specify whether the use of the rule – should be logged (set *Log* to **Yes**) or – should not be logged (set *Log* to **No** – factory default)
	Log entries for unknown connection attempts	When set to **Yes**, all attempts to establish a connection that are not covered by the rules defined above are logged.

6.8.3.4 IKE Options



IPsec VPN >> Connections >> Edit >> IKE Options

ISAKMP SA (Key Exchange)

Encryption Algorithm

Decide on which encryption technique should be used with the remote peer administrator.

3DES-168 is the most commonly used algorithm and is therefore the default setting.

The following generally applies: The greater the number of bits used by an encryption algorithm (specified by the appended number) the more secure it is. The relatively new AES-256 protocol is therefore considered the most secure, but is not yet widely used.

The longer the key, the longer the time required by the encryption process. However, this is of no consequence for the mGuard as it uses a hardware-based encryption technique. This aspect may be of significance for the remote peer.

The algorithm designated as “Null” contains no encryption.

Hash Algorithm

Leave this setting as *All algorithms*. It then does not matter whether the remote peer uses MD5 or SHA-1.

IPsec SA (Data Exchange)

In contrast to *ISAKMP SA (Key Exchange)* (see above), this setting determines the data exchange method. This may or may not be different from the Key Exchange method.

Encryption Algorithm

See above

Hash Algorithm

See above

IPsec VPN >> Connections >> Edit >> IKE Options		
	Perfect Forward Secrecy (PFS)	This method is used to increase the security of the data transfer. In IPsec, the key used for the data exchange is changed at certain intervals. With PFS, a new random number is negotiated with the remote peer instead of deriving it from a previously agreed random number. Only set this to **Yes** if the remote peer supports PFS. Set *Perfect Forward Secrecy (PFS)* to **No** if the remote peer is an IPsec/L2TP client.
Lifetimes	**The keys of an IPsec connection are renewed at certain intervals to increase the costs of an attack to the IPsec connection.**	
	ISAKMP SA Lifetime	The lifetime of the ISAKMP SA keys in seconds. Factory default: 3600 seconds (1 hour). The permitted maximum is 86400 seconds (24 hours).
	IPsec SA Lifetime	The lifetime of the IPsec SA keys in seconds. Factory default: 28800 seconds (8 hours). The permitted maximum is 86400 seconds (24 hours).
	Rekeymargin	Minimum time interval before the old key expires during which a new key should be created. Factory default: 540 seconds (9 minutes).
	Rekeyfuzz	Maximum in percent by which *Rekeymargin* shall be randomly increased. This is used to delay key exchange on machines with many VPN connections. Factory default: 100%.
	Keying tries (0 means unlimited tries)	Number of attempts to negotiate new keys with the remote peer. The value 0 results in unlimited attempts for connections initiated by the mGuard, otherwise it results in 5.
	Rekey	**Yes / No** When set to **Yes**, the mGuard will try to negotiate a new key when the old one expires.
Dead Peer Detection	**When the remote peer supports the Dead Peer Detection (DPD) protocol, both partners can detect whether the IPsec connection is still valid or must be restored.**	

IPsec VPN >> Connections >> Edit >> IKE Options		
	Delay between requests for a sign of life	The time in seconds after which *DPD Keep Alive* queries are sent. These queries test whether the remote peer is still available. Factory default: 30 seconds.
	Timeout for absent sign of life after which peer is assumed dead	The time in seconds after which the remote peer is declared dead if *Keep Alive* queries are not answered. Factory default: 120 seconds. If the mGuard finds that a connection is dead, it acts according to the setting under **Connection startup** (see definition of this VPN connection under *General,* **Connection startup**).

6.8.4 IPsec VPN >> L2TP over IPsec

Allows VPN connections using the IPsec/L2TP mGuard protocol.

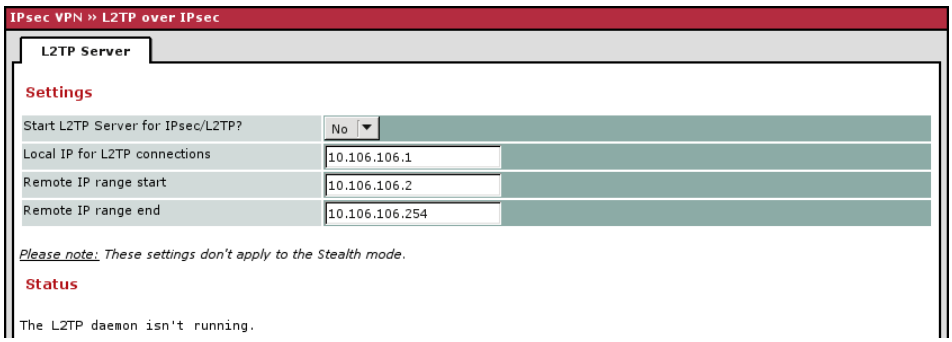
In doing so, the L2TP protocol is driven using an IPsec transport connection in order to establish a tunnel connection with a Point-to-Point Protocol (PPP). Clients are automatically assigned IP addresses through PPP.

In order to use IPsec/L2TP, the L2TP server must be activated and one or more IPsec connections with the following characteristics must be defined:

– **Type:** Transport
– **Protocol:** UDP
– **Local port:** %all
– **Remote port:** %all
– **PFS:** No

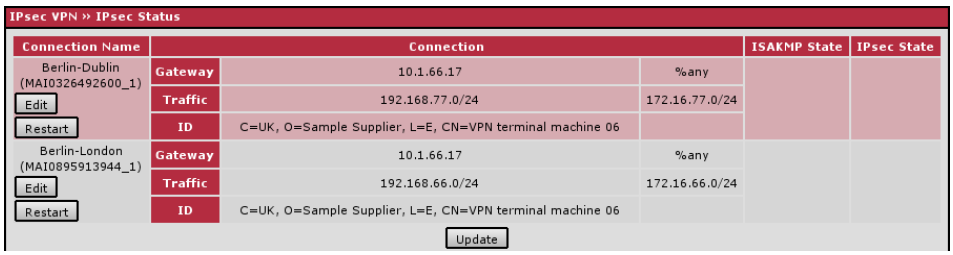
(See also “Further settings can be made by clicking **More...**” on page 6-173, plus “IKE Options” on page 6-185.)

6.8.4.1 L2TP Server



IPsec VPN >> L2TP over IPsec >> L2TP Server		
Settings	**Start L2TP Server for IPsec/L2TP?**	If you want to enable IPsec/L2TP connections, set this option to **Yes**. It is then possible to establish incoming L2TP connections over IPsec, which dynamically assign IP addresses to the clients within the VPN.
	Local IP for L2TP connections	If set as shown in the screenshot above, the mGuard will inform the remote peer that its address is 10.106.106.1.
	Remote IP range start / end	If set as shown in the screenshot above, the mGuard will assign the remote peer an IP address between 10.106.106.2 and 10.106.106.254.
	Status	Shows L2TP status information, when this connection type has been selected.

6.8.5 IPsec VPN >> IPsec Status



Shows the status of IPsec connections.

The names of the VPN connections are listed on the left. On the right, you will find the current status of each connection.

Buttons

Update Click on **Update** to update the displayed data.

Restart Click on **Restart** to terminate the connection and restart it again.

Edit Click on **Edit** to make changes to the configuration of the connection.

Connection, ISAKAMP Status, IPsec Status

GATEWAY *GATEWAY* shows the IP addresses of the communicating VPN gateways.

TRAFFIC *TRAFFIC* identifies the systems or networks which communicate via the VPN gateways.

ID Identifies the subject of an X.509 certificate.

ISAKMP State *ISAKMP State* (Internet security association and key management protocol) is given as “established” if both VPN gateways involved have established a channel for key exchange. In this case, they have contacted each other and all settings made on the configuration page up to and including “ISAKMP SA” were correct.

IPsec State *IPsec State* is given as “established” if IPsec encryption is activated during communication. In this case, the entries made under “IPsec SA” and “Tunnel Settings” were also correct.

In the event of problems, we recommend that you examine the VPN logs of the remote peer where the connection was setup. Detailed error messages are not returned to the initiating system for security reasons.

If the display shows:	This means:
ISAKMP SA established, IPsec State: WAITING	The authentication was successful, but the other parameters are incorrect. Do the connection types (Tunnel, Transport) match? If Tunnel has been selected, do the network address areas match on both sides?
IPsec State: IPsec SA established	The VPN connection has been successfully set up and can be used. If this is not possible, there is a problem with the remote peer VPN gateway. In this case, disable and enable the connection again to re-establish the connection.

6.9 SEC-Stick menu

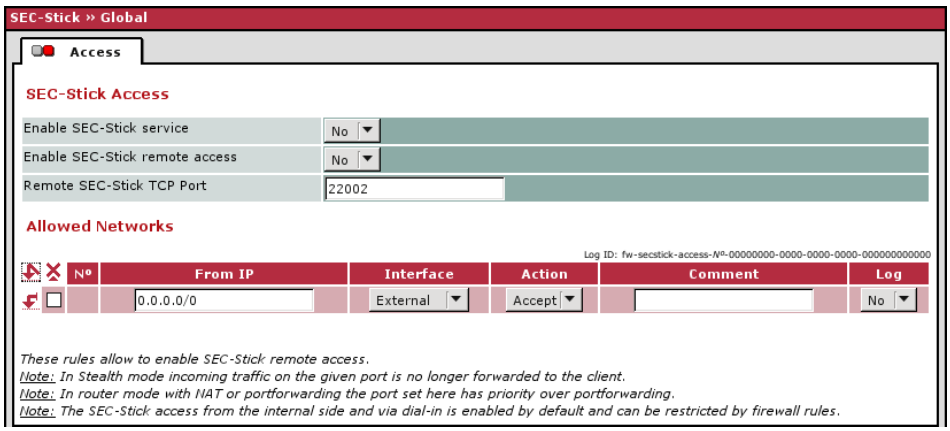
The mGuard supports the use of a SEC-Stick, an access protector for IT systems. The SEC-Stick is a product of the team2work company: www.team2work.de.

The SEC-Stick is a key. The user inserts it into the USB port of a computer with an Internet connection, and can then set up an encrypted connection to the mGuard in order to securely access defined services in the office or home network. For example, the Remote Desktop Protocol can be used within the encrypted and secure SEC-Stick connection to control a PC remotely in the office or at home, as if the user was sitting directly in front of it.

This works because access to the business PC is protected by the mGuard and the mGuard can be configured for the SEC-Stick to permit access. The user of this remote computer, where the SEC-Stick is inserted, authenticates himself to the mGuard with the data and software stored on his SEC-Stick.

The SEC-Stick establishes an SSH connection to the mGuard. Other channels can be embedded in this connection, e.g. TCP/IP connections.

6.9.1 Global


SEC-Stick » Global
Access
SEC-Stick Access
Enable SEC-Stick service
No
Enable SEC-Stick remote access
No
Remote SEC-Stick TCP Port
22002
Allowed Networks
Log ID: fw-secstick-access-Nº-00000000-0000-0000-0000-000000000000
Nº
From IP
Interface
Action
Comment
Log
0.0.0.0/0
External
Accept
No
These rules allow to enable SEC-Stick remote access.
Note: In Stealth mode incoming traffic on the given port is no longer forwarded to the client.
Note: In router mode with NAT or portforwarding the port set here has priority over portforwarding.
Note: The SEC-Stick access from the internal side and via dial-in is enabled by default and can be restricted by firewall rules.

SEC-Stick >> Global >> Access

SEC-Stick Access

A license is required for the SEC-Stick access function. It can only be used if the corresponding license has been purchased and installed.

Enable SEC-Stick service: By selecting **Yes**, you specify that the SEC-Stick being used at a remote location, or its owner, can login. In this case, SEC-Stick remote access must also be enabled (next switch).

Enable SEC-Stick remote access **Yes** enables the SEC-Stick remote access.

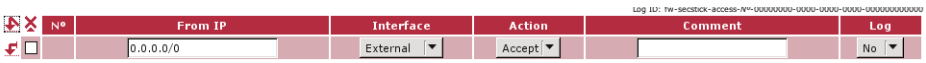
Remote SEC-Stick TCP Port Default: 22002

If this port number is changed, the new port number only applies for access over the *External, External 2* or *VPN* interfaces. Port number 22002 still applies for internal access.

SEC-Stick >> Global >> Access (continued)

Allowed Networks

Lists the firewall rules that have been set. They apply to SEC-Stick remote access.



If multiple firewall rules are set, they will be searched in the order in which they are listed (top-down) until a suitable rule is found. This rule is then applied. If there are other suitable rules further down the list, these are ignored.

The rules specified here only become effective if **Enable SEC-Stick remote access** is set to **Yes**. *Internal* access is also possible when this option is set to *No*. A firewall rule that would refuse *Internal* access is therefore not effective in this case.

You can specify multiple rules.

From IP

Enter the address of the system or network where remote access is permitted or forbidden in this field.

IP address: **0.0.0.0/0** means all addresses. To enter an address, use CIDR notation (see 6-213).

Interface

External / Internal / External 2 / VPN / Dial-in[1]

Specifies which interface the rules apply to.

If no rules are set, or if no rule takes effect, the following default settings apply:

– SEC-Stick access is permitted over *Internal, VPN* and *Dial-in*.

– Access over *External* and *External 2* is refused.

Specify the access possibilities according to your requirements.

If you want to refuse access over *Internal, VPN* or *Dial-in*, you must implement this explicitly through corresponding firewall rules, by specifying *Drop* as an action, for example.

Action

Accept means that data packets may pass through.

Reject means that the data packets are rejected. The sender is informed that the data packets have been rejected. (In *Stealth* mode, *Reject* has the same effect as *Drop*.)

Drop means that data packets may not pass through. Data packets are discarded and the sender is not informed of their whereabouts.

Comment

Freely selectable comment for this rule.

Log

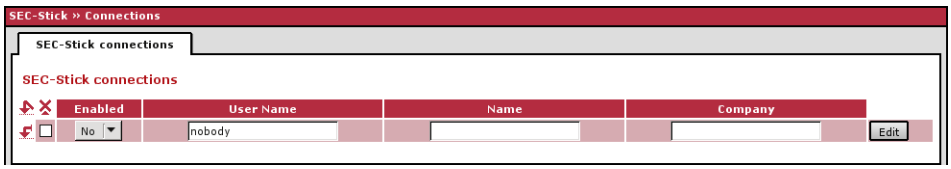
For each individual firewall rule, you can specify whether the use of the rule

– should be logged (set *Log* to **Yes**) or

– should not be logged (set *Log* to **No** – factory default)

1 *External 2* and *Dial-in* are only for devices with serial ports (see “Network >> Interfaces” on page 6-55).

6.9.2 SEC-Stick connections



SEC-Stick >> Connections >> SEC-Stick connections

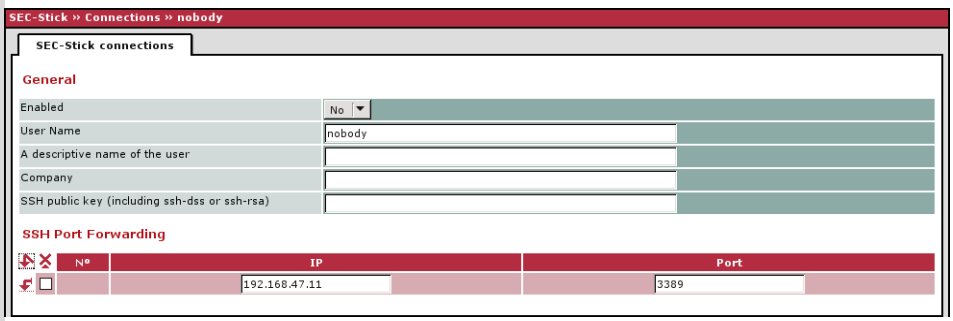
SEC-Stick connections

List of the defined SEC-Stick connections. If you want to add a new connection, click on the downwards arrow on the top left. You can edit an existing connection by clicking the Edit button.

Not all the functions of the SEC-Stick can be configured using the web interface of the mGuard.

Enabled	The **Enabled** switch must be set to **Yes** for a defined SEC-Stick connection to be used.
User Name	A SEC-Stick connection with a uniquely assigned user name must be defined for every owner of a SEC-Stick who has authorized access. This user name is used to identify the defined connections.
Name	Name of the person.
Company	The name of the company.

After clicking on the **Edit** button, the following page appears:



General

Enabled	As above
User Name	As above
A descriptive name of the user	Name of the person. (Repeated)
Company	As above
SSH public key (including ssh-dss or ssh-rsa)	Here you must enter the SSH public key belonging to the SEC-Stick in ASCII format. The secret equivalent is stored on the SEC-Stick.

SSH Port Forwarding

List of the allowed access and SSH port forwarding relating to the SEC-Stick of the corresponding user.

IP	IP address of the computer to which the access is allowed.
Port	Port number to be used when accessing the computer.

6.10 QoS menu

QoS (Quality of Service) defines the quality of individual transfer channels in IP networks. This relates to the allocation of certain resources to certain services or communication types so that they work correctly. For example, the necessary bandwidth must be provided for the transfer of audio or video data in real time in order to reach a satisfactory communication level. At the same time, a slower data transfer by FTP or e-mail does not threaten the overall success of the transfer (file or e-mail transfer).

6.10.1 Ingress Filter

An Ingress Filter prevents the processing of certain data packages by filtering and dropping them before they enter the processing mechanism. The mGuard can use an Ingress Filter to avoid processing data packets that are not needed in the network. This results in a quicker processing of remaining (required) data packages.

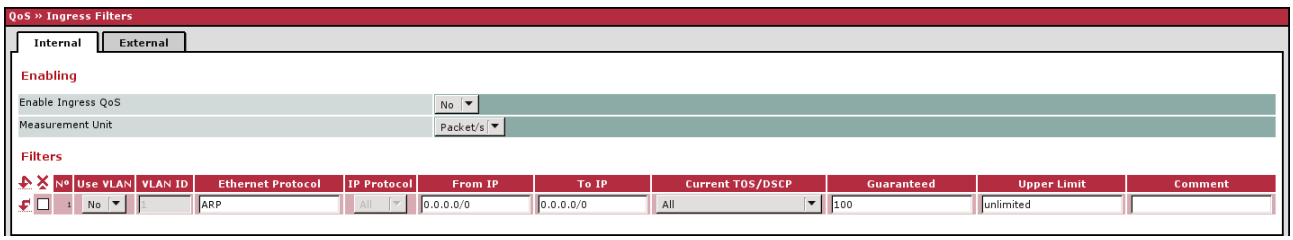
Using suitable filter rules, administrative access to the mGuard can be ensured with high probability, for example.

Packet processing on the mGuard is generally defined by the handling of individual data packets so that the processing performance depends on the number of packets and not on bandwidth.

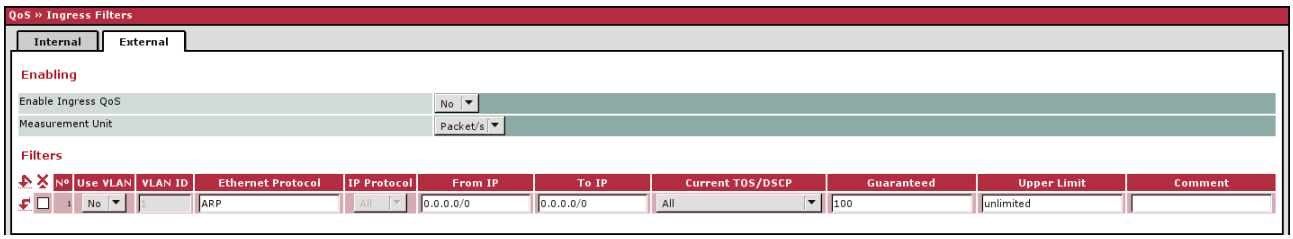
Filtering is only made according to characteristics that are present in each data packet: The sender and recipient IP address in the header, Ethernet protocol, IP protocol, TOS/DSCP value and/or the VLAN ID (if VLANs have been configured). As the list of filter rules must be applied to each individual data packet, it should be kept as short as possible. Otherwise, the time spent on filtering could be longer than the time saved by setting the filter itself.

Please note that not all filter criteria can be combined. For example, it does not make sense to enter an additional IP protocol in the same rule record as the ARP Ethernet protocol. This also applies to the entry of a sender or recipient IP address under the hexadecimal IPX Ethernet protocol.

6.10.1.1 Internal / External



Internal: Setting of Ingress Filters on the LAN interface



External: Setting of Ingress Filters on the WAN interface

QoS menu >> Ingress Filter >> Internal / External		
Enabling	**Enable Ingress QoS**	**No** (default): Feature is disabled. If filter rules are defined, then they are ignored. **Yes:** Feature is enabled. Data packets will only be transferred to the mGuard for further processing when they conform to the following filter rules. Filters can be set for the LAN port (**Internal** tab page) and the WAN port (**External** tab page).
	Measurement Unit	**kbit/s / packets/s** Defines the unit for the numerical values entered below under **Guaranteed** and **Upper Limit**.
Filter	**Use VLAN**	If VLAN is configured, then the VLAN ID can be entered to allow the affected data packets to pass through. To do so, the option must be set to **Yes**.
	VLAN ID	Defines that the VLAN data packets that have this ID may pass through. (The **Use VLAN** option must be set to **Yes**.)
	Ethernet Protocol	Defines that only data packets from the given Ethernet protocol may pass. Possible entries: **ARP**, **IPV4**, **%any**. Other entries must be given in hexadecimal form (up to 4 figures). (The entry here is the ID of the affected protocol that can be found in the Ethernet header. This can be found in the publication of the affected standard).
	IP Protocol	**All / TCP / UDP / ICMP / ESP** Defines that only data packets from the selected IP protocol may pass. When **All** is selected, no filtering is performed on the basis of the IP protocol.
	From IP	Defines that only data packets from the given IP address may pass. **0.0.0.0/0** stands for all addresses. This means that no filtering is performed on the basis of the IP address of the sender. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213).

QoS menu >> Ingress Filter >> Internal / External (continued)		
	To IP	Defines that only data packets that should be forwarded to the given IP address may pass through. Entries correspond to *From IP*, as detailed above. **0.0.0.0/0** stands for all addresses. This means that no filtering is performed on the basis of the IP address of the sender.
	Current TOS/DSCP	Each data packet contains a TOS or DSCP field (TOS stands for Type Of Service, DSCP for Differentiated Services Code Point). The traffic type to which the data packet belongs is specified here. For example, an IP telephone will write something different in this field for outgoing data packets compared to an FTP program. When a value is selected here, then only data packets with this value in the TOS or DSCP field may pass through. When **All** is selected, no filtering is performed on the basis of the TOS/DSCP value.
	Guaranteed	The entered number defines how many data packets or kbit/s can pass through at all times (according to the **Measurement Unit** set – see above). This applies to the data flow that conforms to the rule record criteria listed on the left (i.e. that may pass through). The mGuard **may** drop the excess number of data packets during capacity bottlenecks if this data flow delivers more data packets per second.
	Upper Limit	The entered number defines the maximum number of data packets or kbit/s that can pass through (according to the **Measurement Unit** set – see above). This applies to the data flow that conforms to the rule record criteria listed on the left (i.e. that may pass through). The mGuard will drop the excess number of data packets if this data flow delivers more data packets per second.
	Comment	Optional text comment.

6.10.2 Egress Queues

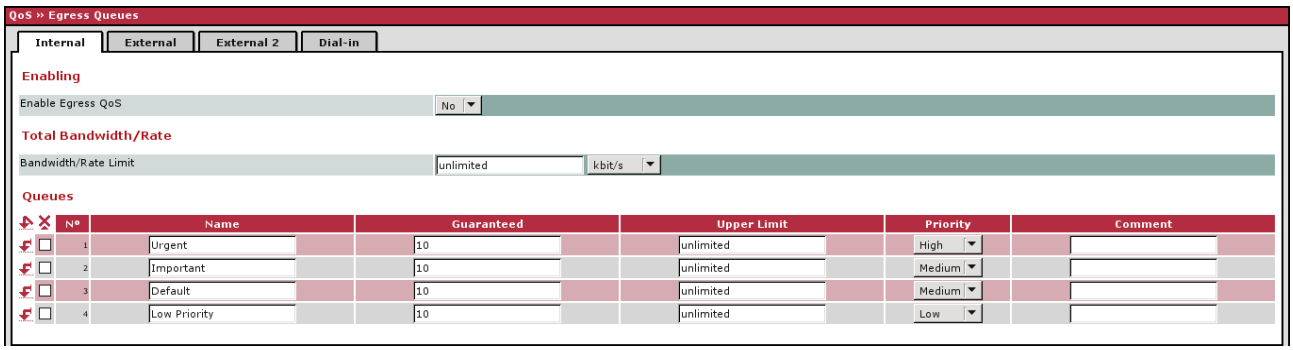
The services are allocated according to defined priorities. During connection bottlenecks, the outgoing data packets are put into egress queues (i.e. queues for waiting packets), and are then processed according to their priority. Ideally, the allocation of priority levels and bandwidths should result in a sufficient bandwidth level being available for the complete transfer of data packets in real-time, whilst other packets (e.g. FTP downloads) are set to wait in critical cases.

The main function of Egress QoS is the optimal utilization of the available bandwidth on a connection. In certain cases, a limitation of the packet rate can be useful (e.g. to protect a slow computer from overloading in the protected network).

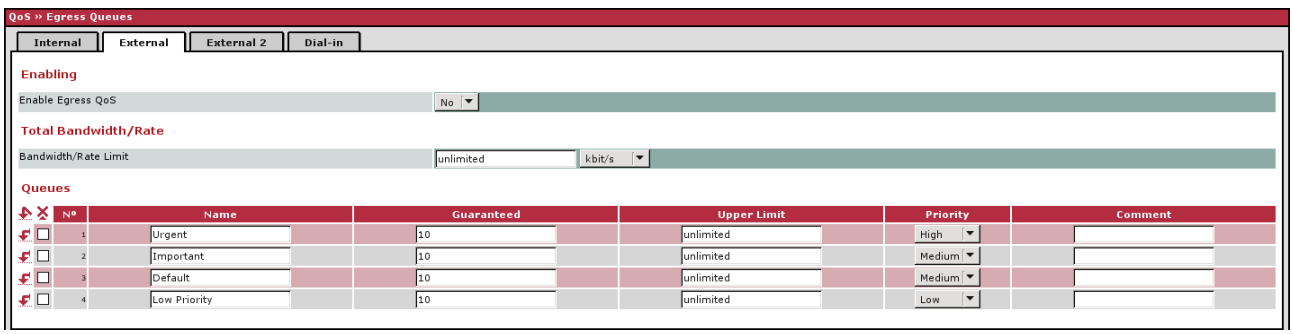
The *Egress Queues* feature can be used for all interfaces and for VPN connections.

6.10.2.1 Internal / External / External 2 / Dial-in

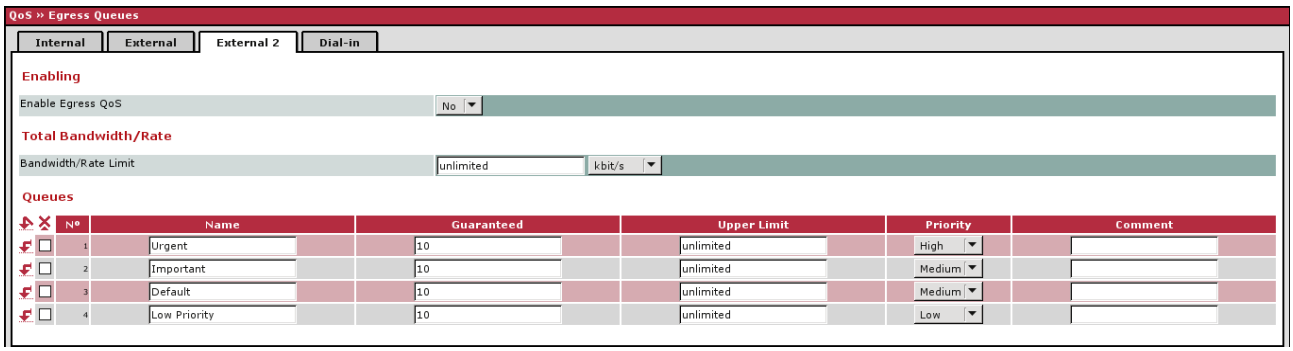
Internal: Setting of Egress Queues on the LAN interface



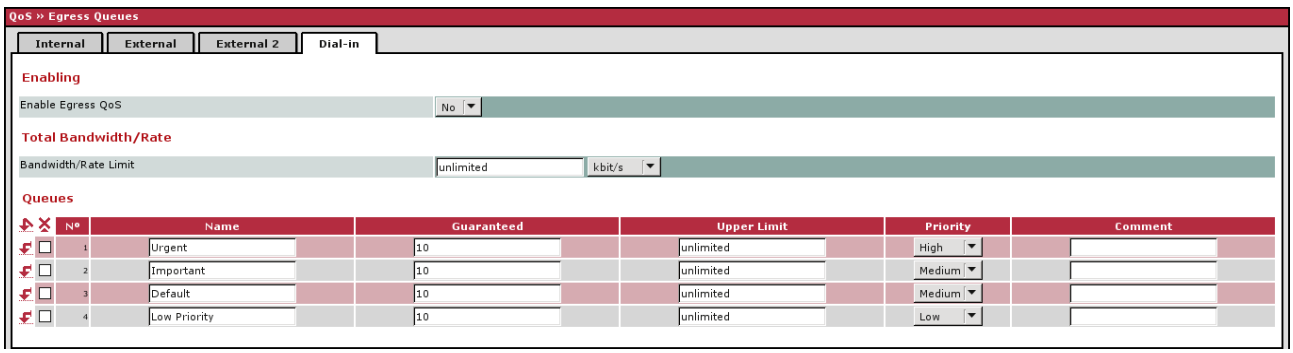
External: Setting of Egress Queues on the external WAN interface



External 2: Setting of Egress Queues on the secondary external interface.



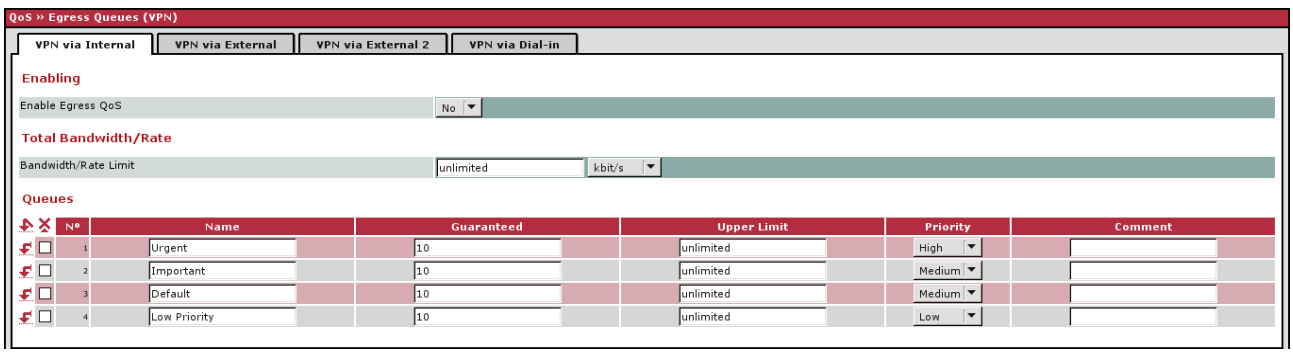
Dial-in: Setting of Egress Queues for packets for PPP dial connection (dial-in)



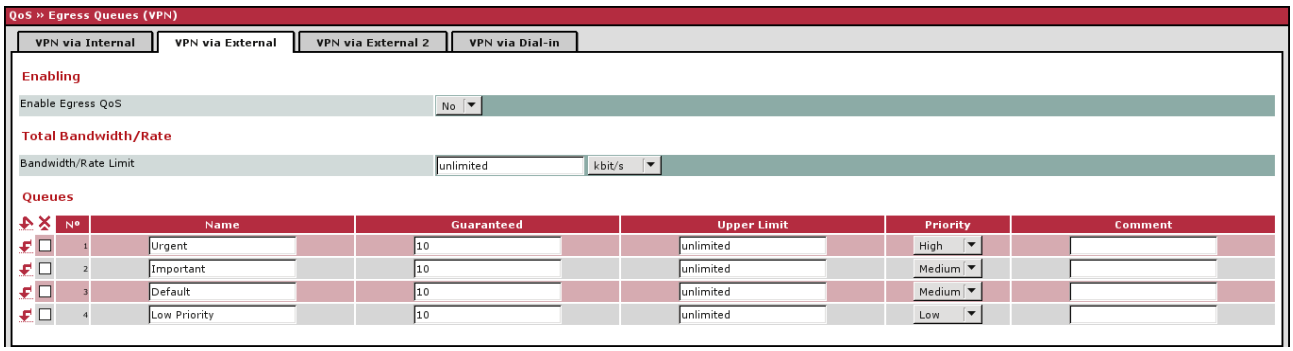
6.10.3 Egress Queues (VPN)

6.10.3.1 VPN via Internal / VPN via External / VPN via External 2 / VPN via Dial-in

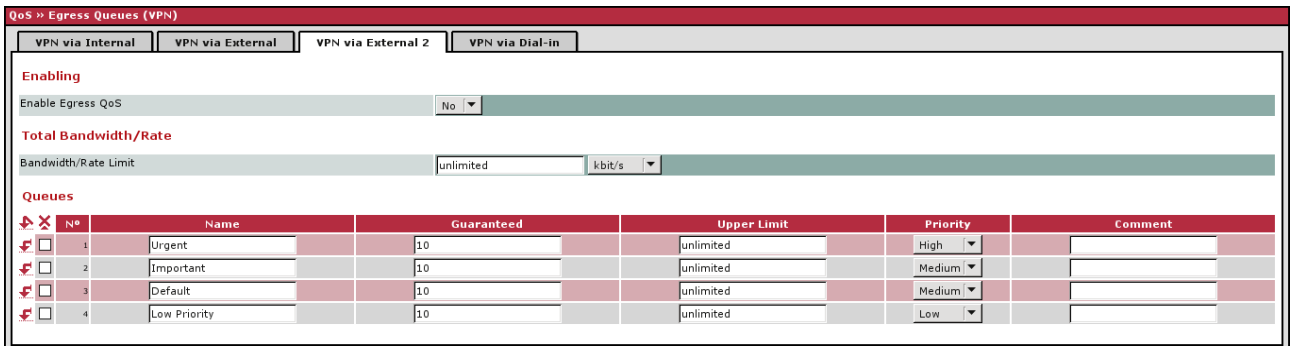
VPN via Internal: Setting of Egress Queues



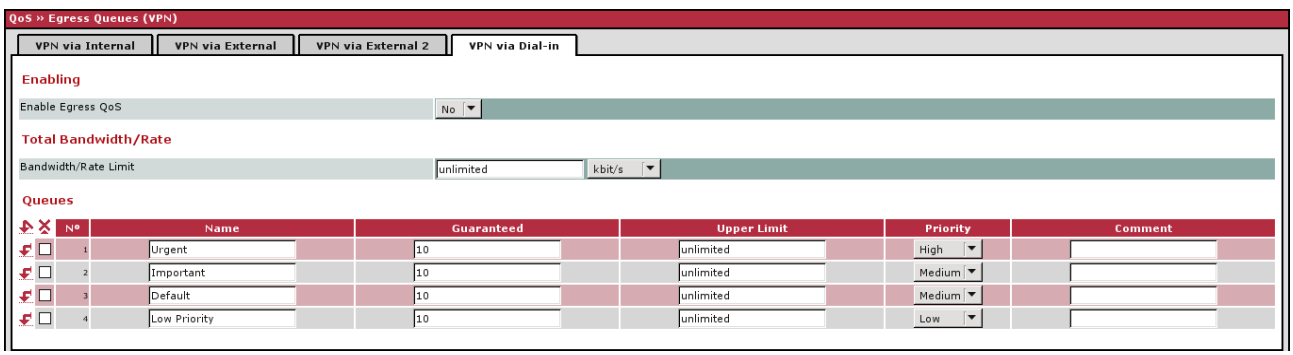
VPN via External: Setting of Egress Queues



VPN via External 2: Setting of Egress Queues



VPN via Dial-in: Setting of Egress Queues



All the tab pages listed above for *Egress Queues* for the *Internal, External, External 2, Dial-in* interfaces, and for VPN connections made over these interfaces, provide the same setting possibilities.

In all cases, the settings relate to the data that is sent externally to the network from the respective mGuard interface.

QoS menu >> Egress Queues >> Internal / External / External 2 / Dial-in QoS menu >> Egress Queues (VPN) >> VPN via Internal / VPN via External / VPN via External 2 / VPN via Dial-in		
Enabling	**Enable Egress QoS**	**No** (default): Feature is disabled. **Yes:** Feature is enabled. This is recommended when the interface is connected to a network with a small bandwidth. This allows the bandwidth allocation to be influenced in favor of especially important data.
Total Bandwidth / Rate	**Bandwidth / Rate Limit**	**kbit/s / packets/s** Maximum available bandwidth – measured in kbit/s or packets/s. In order for an optimal prioritization process, the total bandwidth entered here should be slightly lower than the actual amount. This prevents an overrun in the transferring device buffer, which would create adverse effects.
Queues	**Name**	You can apply the preset name for the Egress Queues or select another one. The name does not define data priority.
	Guaranteed	Bandwidth that should be available for the relevant queue. Use the same units as defined above under **Bandwidth/Rate Limit** (**kbit/s** OR **packet/s**) but do not enter the unit of measurement explicitly. The total of all guaranteed bandwidths must be smaller or equal to the total bandwidth.
	Upper Limit	Maximum permitted bandwidth available for the relevant queue. Use the same units as defined above under **Bandwidth / Rate Limit** (**kbit/s** OR **packet/s**) but do not enter the unit of measurement explicitly. This value must be the same as or larger than the guaranteed bandwidth. You can also enter the **unlimited** setting, which means no further restriction.
	Priority	Low / Medium / High Defines with which priority the affected queue should be processed, providing the total available bandwidth is not exhausted.
	Comment	Optional text comment.

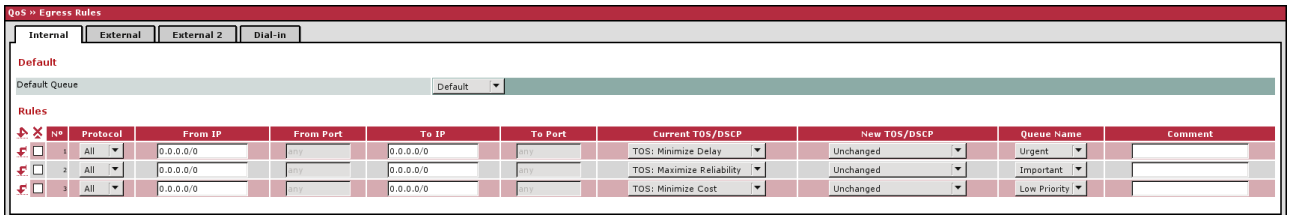
6.10.4 Egress Rules

This page defines which data is assigned to the defined Egress Queues (see above).

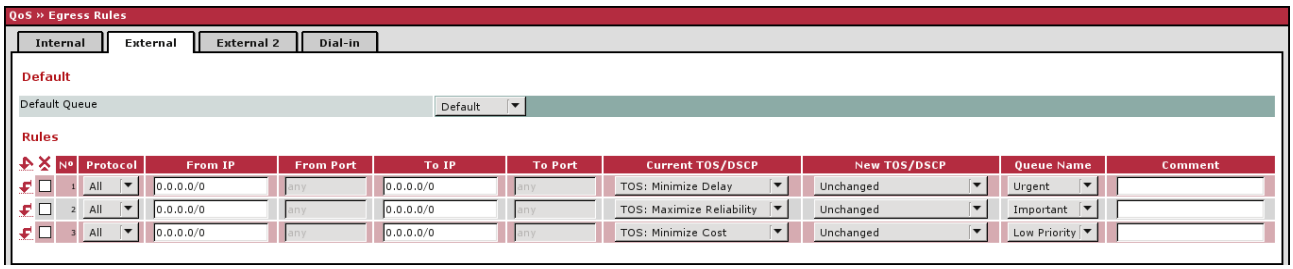
Rules can be defined separately for all interfaces and also for VPN connections.

6.10.4.1 Internal / External / External 2 / Dial-in

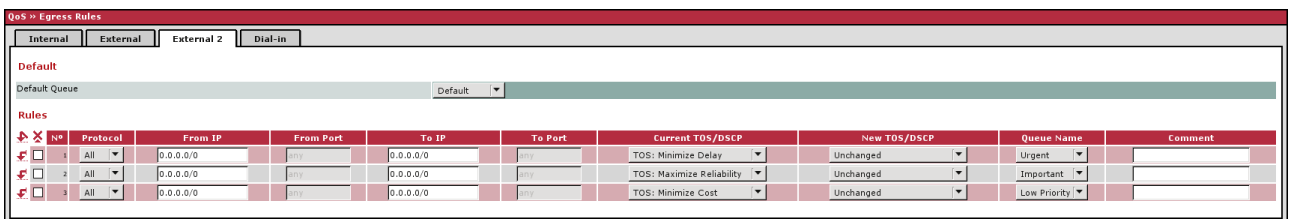
Internal: Setting of Egress Queue rules



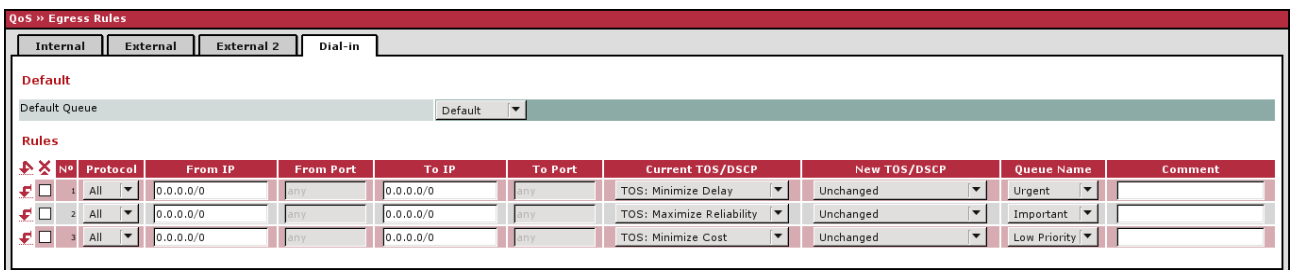
External: Setting of Egress Queue rules



External 2: Setting of Egress Queue rules



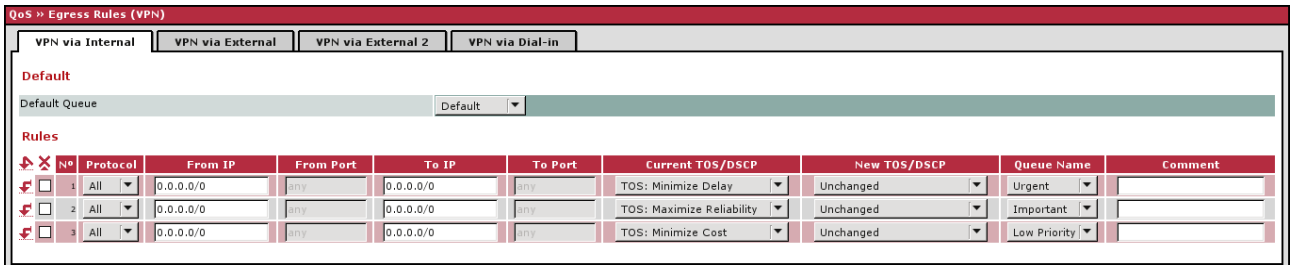
Dial-in: Setting of Egress Queue rules



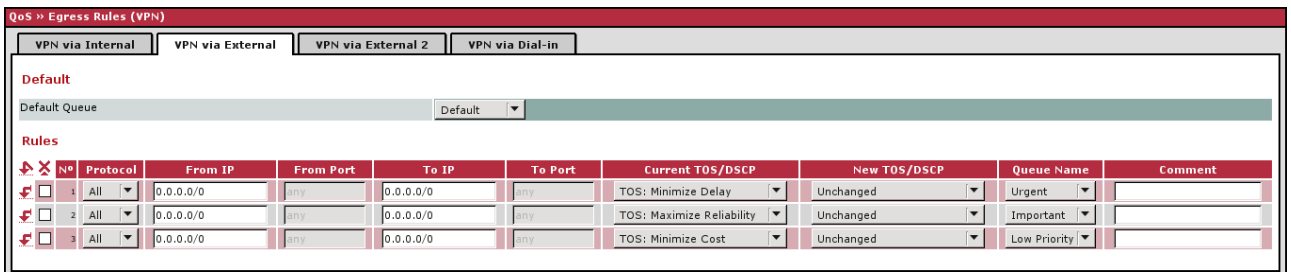
6.10.4.2 Egress Rules (VPN)

VPN via Internal / VPN via External / VPN via External 2 / VPN via Dial-in

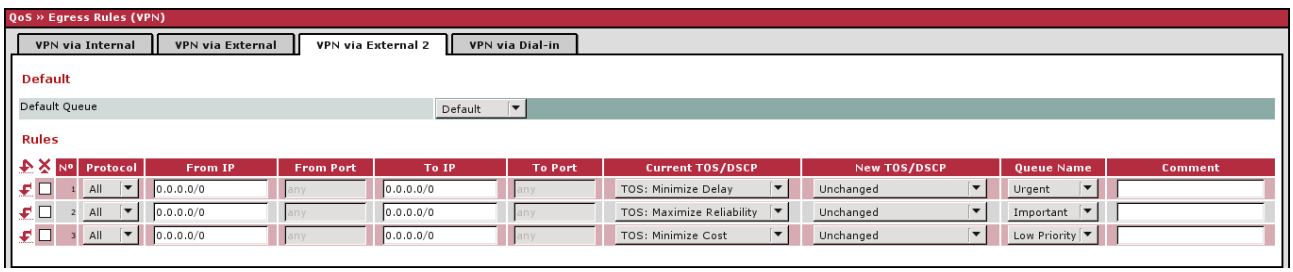
VPN via Internal: Setting of Egress Queue rules



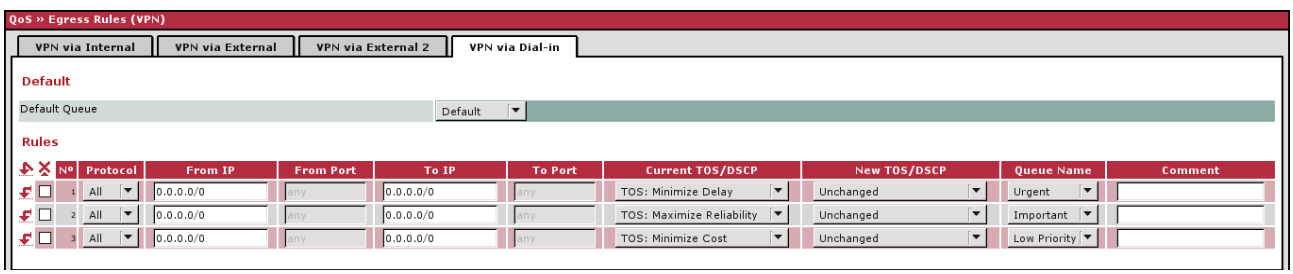
VPN via External: Setting of Egress Queue rules



VPN via External 2: Setting of Egress Queue rules



VPN via Dial-in: Setting of Egress Queue rules



All the tab pages listed above for *Egress Rules* for the *Internal, External, External 2, Dial-in* interfaces, and for VPN connections made over these interfaces, provide the same setting possibilities.

In all cases, the settings relate to the data that is sent externally to the network from the respective mGuard interface.

QoS menu >> Egress Rules >> Internal / External / External 2 / Dial-in QoS menu >> Egress Rules (VPN) >> VPN via Internal / VPN via External / VPN via External 2 / VPN via Dial-in		
Default	**Default Queue**	*Name of the Egress Queue* (user-defined) The names of queues are displayed as listed or defined under *Egress Queues* on the *Internal* / *External* / *VPN via External* tab pages. The following names are defined as standard: Default / Urgent / Important / Low Priority. Traffic that is **not** allocated to an Egress Queue under *Rules* remains in the *Default Queue*. You can specify which Egress Queue is used as the *Default Queue* in this selection list.
	Rules	The allocation of specific data traffic to an Egress Queue is based on a list of criteria. If the criteria in a row apply to a data packet, it is allocated to the Egress Queue named in the row. **Example:** You have defined a queue with guaranteed bandwidth and priority for transferred audio data under Egress Queues (see page 6-196) under the name *Urgent*. Specify the rules for how the audio data is defined here, and that this data belongs in the *Urgent* queue.
	Protocol	**All / TCP / UDP / ICMP / ESP** Protocols relating to the allocation.
	From IP	IP address of the network or device where the data originates from. **0.0.0.0/0** means all IP addresses. To enter an address, use CIDR notation (see “CIDR (Classless Inter-Domain Routing)” on page 6-213). Allocate the traffic from this source to the queue selected under *Queue Name* towards the back of this row.
	From Port	Port used at the source where the data originates from (only evaluated for TCP and UDP protocols). – **any** describes any selected port. – **startport:endport** (e.g. 110:120) defines a range of ports. You can specify individual ports by giving either their port number or the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).
	To IP	IP address of the network or device where the data is sent to. Entries correspond to *From IP*, as detailed above.
	To Port	Port used at the source where the data is sent to. Entries correspond to *From Port*, as detailed above.

QoS menu >> Egress Rules >> Internal / External / External 2 / Dial-in QoS menu >> Egress Rules (VPN) >> VPN via Internal / VPN via External / VPN via External 2 / VPN via Dial-in		
	Current TOS/DSCP	Each data packet contains a TOS or DSCP field (TOS stands for Type Of Service, DSCP for Differentiated Services Code Point). The traffic type to which the data packet belongs is specified here. For example, an IP telephone will write something different in this field for outgoing data packets compared to an FTP program that loads the data packets to a server. When you select a value here, only the data packets that have this TOS or DSCP value in the corresponding fields are chosen. These values are then set to a different value according to the entry in the **New TOS/DSCP** field.
	New TOS/DSCP	If you want to change the TOS/DSCP values of the data packets that are selected using the defined rules, then enter what should be written in the TOS or DSCP field here. Further details concerning the **Current TOS/DSCP** and **New TOS/DSCP** can be found in the following RFC documentation: – RFC3260 “New Terminology and Clarifications for Diffserv” – RFC3168 “The Addition of Explicit Congestion Notification (ECN) to IP” – RFC2474 “Definition of the Differentiated Services Field (DS Field)” – RFC1349 “Type of Service in the Internet Protocol Suite”
	Queue Name	Name of the Egress Queue where the traffic is assigned.
	Comment	Optional text comment.

6.11 Redundancy menu

The “Ring/Network Coupling” function is not available in firmware version 7.0.

The “Firewall Redundancy” function is not available in firmware version 7.0.

Devices with an installed license for firewall redundancy reject firmware updates to version 7.0 when the “Firewall Redundancy” function is activated.

6.12 Logging menu

Logging is the recording of event messages (e.g. concerning settings that have been made, firewall rules taking effect, errors etc.).

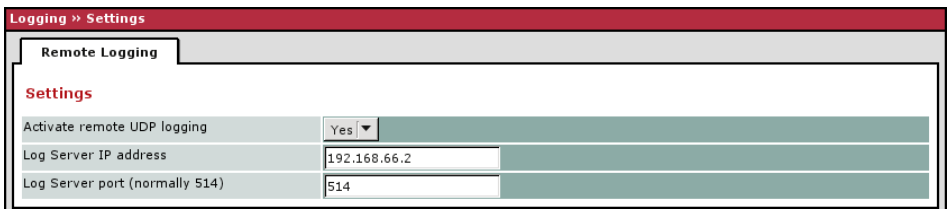
Log entries are recorded in different categories and can be displayed according to these categories (see “Logging >> Browse local logs” on page 6-206).

6.12.1 Logging >> Settings

6.12.1.1 Remote Logging

All log entries are recorded by default in the mGuard’s RAM. Once the memory for log entries has been filled, the oldest log entries are overwritten. Furthermore, all log entries are deleted when the mGuard is switched off.

To prevent this, the log entries (SysLog messages) can be transferred to an external system (SysLog server). This is particularly useful if you wish to have centralized administration of the logs of multiple mGuards.



Logging >> Remote Logging		
Settings	**Activate remote UDP logging**	**Yes / No** If all log entries should be sent to an external log server (specified below), set this option to **Yes**.
	Log Server IP address	Enter the IP address of the log server where the log entries should be sent via UDP. This entry must be an IP address – not a hostname! This function does not support hostnames, as otherwise it might not be possible to make log entries if a DNS server failed.
	Log Server port (normally 514)	Enter the port of the log server where the log entries should be sent via UDP. Default: 514

If SysLog messages are to be transferred to a SysLog server via a VPN channel, the IP address of the SysLog server must be located in the network that is entered as the **remote** network in the definition of the VPN connection.

The internal IP address (in Stealth mode, the **Stealth Management IP Address** or the **Virtual IP**) must be located in the network that is entered as **local** in the definition of the VPN connection (see “Defining VPN connection / VPN connection channels” on page 6-167).

Logging >> Remote Logging (continued)

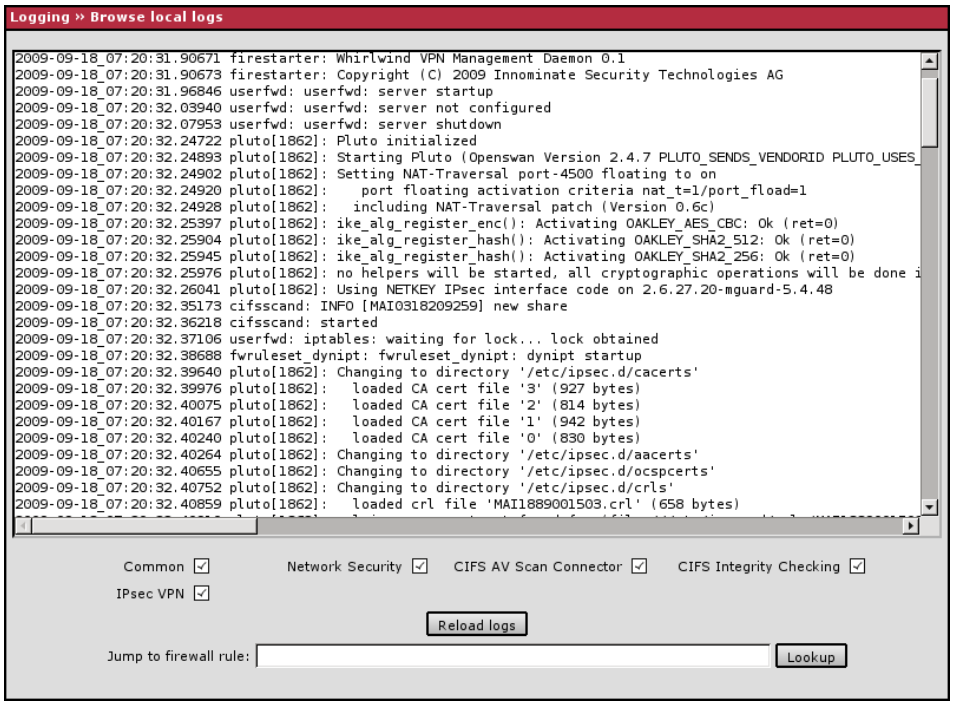
– If the **Enable 1-to-1 NAT of the local network to an internal network** option is set to **Yes**, (see “1:1 NAT” on page 6-174), the following applies:

  The internal IP address (in Stealth mode, the **Stealth Management IP Address** or the **Virtual IP**) must be located in the network that is entered as **Internal network address for local 1-to-1 NAT**.

– If the **Enable 1-to-1 NAT of the remote network to another network** option is set to **Yes**, (see “1:1 NAT” on page 6-174), the following applies:

  The IP address of the SysLog server must be located in the network that is entered as **remote** in the definition of the VPN connection.

6.12.2 Logging >> Browse local logs


Logging » Browse local logs
2009-09-18_07:20:31.90671 firestarter: Whirlwind VPN Management Daemon 0.1
2009-09-18_07:20:31.90673 firestarter: Copyright (C) 2009 Innominate Security Technologies AG
2009-09-18_07:20:31.96846 userfwd: userfwd: server startup
2009-09-18_07:20:32.03940 userfwd: userfwd: server not configured
2009-09-18_07:20:32.07953 userfwd: userfwd: server shutdown
2009-09-18_07:20:32.24722 pluto[1862]: Pluto initialized
2009-09-18_07:20:32.24893 pluto[1862]: Starting Pluto (Openswan Version 2.4.7 PLUTO_SENDS_VENDORID PLUTO_USES_
2009-09-18_07:20:32.24902 pluto[1862]: Setting NAT-Traversal port-4500 floating to on
2009-09-18_07:20:32.24920 pluto[1862]: port floating activation criteria nat_t=1/port_fload=1
2009-09-18_07:20:32.24928 pluto[1862]: including NAT-Traversal patch (Version 0.6c)
2009-09-18_07:20:32.25397 pluto[1862]: ike_alg_register_enc(): Activating OAKLEY_AES_CBC: Ok (ret=0)
2009-09-18_07:20:32.25904 pluto[1862]: ike_alg_register_hash(): Activating OAKLEY_SHA2_512: Ok (ret=0)
2009-09-18_07:20:32.25945 pluto[1862]: ike_alg_register_hash(): Activating OAKLEY_SHA2_256: Ok (ret=0)
2009-09-18_07:20:32.25976 pluto[1862]: no helpers will be started, all cryptographic operations will be done i
2009-09-18_07:20:32.26041 pluto[1862]: Using NETKEY IPsec interface code on 2.6.27.20-mguard-5.4.48
2009-09-18_07:20:32.35173 cifsscand: INFO [MAI0318209259] new share
2009-09-18_07:20:32.36218 cifsscand: started
2009-09-18_07:20:32.37106 userfwd: iptables: waiting for lock... lock obtained
2009-09-18_07:20:32.38688 fwruleset_dynipt: fwruleset_dynipt: dynipt startup
2009-09-18_07:20:32.39640 pluto[1862]: Changing to directory '/etc/ipsec.d/cacerts'
2009-09-18_07:20:32.39976 pluto[1862]: loaded CA cert file '3' (927 bytes)
2009-09-18_07:20:32.40075 pluto[1862]: loaded CA cert file '2' (814 bytes)
2009-09-18_07:20:32.40167 pluto[1862]: loaded CA cert file '1' (942 bytes)
2009-09-18_07:20:32.40240 pluto[1862]: loaded CA cert file '0' (830 bytes)
2009-09-18_07:20:32.40264 pluto[1862]: Changing to directory '/etc/ipsec.d/aacerts'
2009-09-18_07:20:32.40655 pluto[1862]: Changing to directory '/etc/ipsec.d/ocspcerts'
2009-09-18_07:20:32.40752 pluto[1862]: Changing to directory '/etc/ipsec.d/crls'
2009-09-18_07:20:32.40859 pluto[1862]: loaded crl file 'MAI1889001503.crl' (658 bytes)
Common
Network Security
CIFS AV Scan Connector
CIFS Integrity Checking
IPsec VPN
Reload logs
Jump to firewall rule:
Lookup

The corresponding checkboxes for filtering entries according to category are displayed below the log entries depending on which mGuard functions were active.

To display one or more categories, enable the checkboxes for the desired categories and click the **Reload logs** button.

6.12.2.1 Log entry categories

General

Log entries which are not assigned to other categories.

Network Security

Logged events are shown here when the logging of firewall events was selected during the definition of firewall rules (Log = Yes).

Log ID and number for tracing errors

Log entries that refer to the firewall rules listed below have a log ID and number. Using this log ID and number, it is possible to trace the firewall rule that the corresponding log entry refers to and that led to the corresponding event.

Firewall rules and their log ID

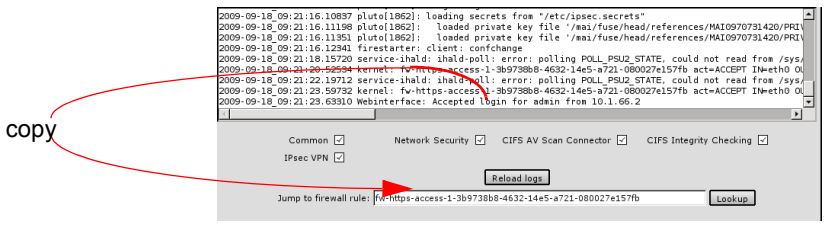
– Packet filters:
  Network Security >> Packet Filter >> Incoming Rules menu
  Network Security >> Packet Filter >> Outgoing Rules menu
  Log ID: **`fw-incoming`** or **`fw-outgoing`**
– Firewall rules for VPN connections:
  IPsec VPN >> Connections >> Edit >> Firewall menu, Incoming / Outgoing
  Log ID: **`vpn-fw-in`** or **`vpn-fw-out`**
– Firewall rules for web access through mGuard via HTTPS:
  Management >> Web Settings >> Access menu
  Log ID: **`fw-https-access`**
– Firewall rules for web access through mGuard via SNMP:
  Management >> SNMP >> Query menu
  Log ID: **`fw-snmp-access`**
– Firewall rules for SSH remote access to the mGuard:
  Management >> System Settings >> Shell Access menu
  Log ID: **`fw-ssh-access`**
– Firewall rules for the user firewall:
  Network Security >> User Firewall menu, Firewall rules
  Log ID: **`ufw-`**
– Rules for NAT, port forwarding:
  Network >> NAT >> Port Forwarding menu
  Log ID: **`fw-portforwarding`**
– Firewall rules for serial port:
  Network >> Interfaces >> Dial-in menu
  Incoming Rules
  Log ID: **`fw-serial-incoming`**
  Outgoing Rules
  Log ID: **`fw-serial-outgoing`**

Searching for firewall rules on the basis of a network security log

If the **Network Security** checkbox is enabled so that the relevant log entries are displayed, the **Jump to firewall rule** search field is displayed under the *Reload logs* button.

Proceed as follows if you want to trace the firewall rule referenced by a log entry in the *Network Security* category that resulted in the corresponding event:

1. Mark the section that contains the log ID and number in the relevant log entry, for example: fw-https-access-1-1ec2c133-dca1-1231-bfa5-000cbe01010a



2. Copy this section into the **Jump to firewall rule** field via the clipboard.
3. Click on the **Lookup** button.
   The configuration page containing the firewall rule that the log entry refers to is displayed.

Blade

In addition to error messages, the following messages are output on the mGuard blade controller:

The areas enclosed by < and > are replaced by the respective data in the log entries.

General messages:

```
blade daemon "<version>" starting ...
Blade[<bladenr>] online
Blade[<bladenr>] is mute
Blade[<bladenr>] not running
Reading timestamp from blade[<bladenr>]
```

When activating a configuration profile on a blade:

```
Push configuration to blade[<bladenr>]
reconfiguration of blade[<bladenr>] returned <returncode>
blade[<bladenr>] # <text>
```

When retrieving a configuration profile from a blade:

```
Pull configuration from blade[<bladenr>]
Pull configuration from blade[<bladenr>] returned <returncode>
```

CIFS AV Scan Connector

In this log, messages about the mGuard's CIFS server, which makes network drives available externally, are displayed.
In addition, messages about mounting network drives to be made available externally are also visible.

CIFS Integrity Checking

Messages relating to the integrity check of network drives are displayed in this log.
In addition, messages that occur when connecting the network drives and that are required for the integrity check are also visible.

DHCP Server/Relay

Messages from services defined under "Network --> DHCP".

SNMP/LLDP

Messages from services defined under "Management --> SNMP".

IPsec VPN

Lists all VPN events.

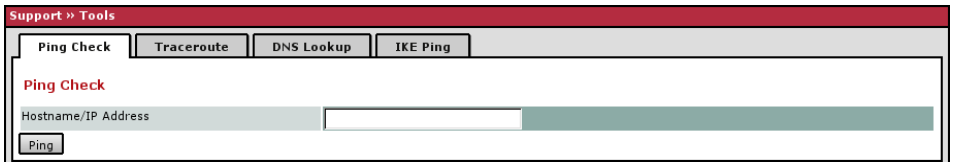
The format corresponds to the standard Linux format.

Special evaluation programs exist that present information from the logged data in a more readable format.

6.13 Support menu

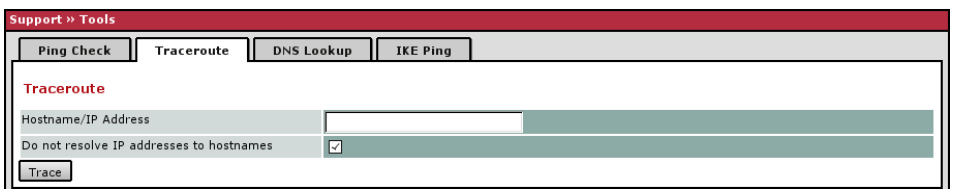
6.13.1 Support >> Tools

6.13.1.1 Ping Check



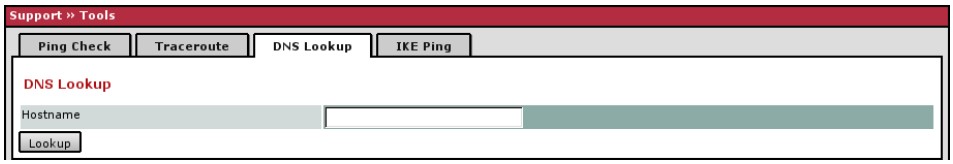
Support >> Tools >> Ping Check	
Ping Check	**Objective:** To check if the remote peer is accessible over a network. **Procedure:** • Enter the IP address or remote peer hostname in the **Hostname/IP Address** field. Click on the **Ping** button. You will then receive an appropriate notification.

6.13.1.2 Traceroute



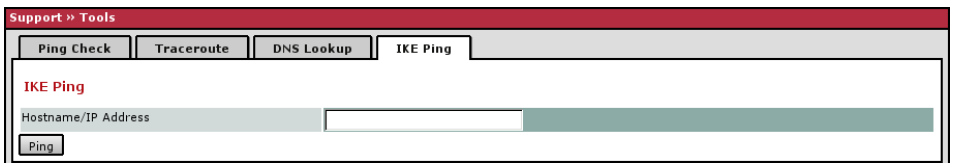
Support >> Tools >> Traceroute	
Traceroute	**Objective:** To establish which intermediary peers or routers are found on the connection path to a remote peer. **Procedure:** • Enter the IP address or hostname of the remote peer to which the route is to be determined in the **Hostname/IP Address** field. • If the points on the route are to be given with IP addresses and not hostnames (if applicable), activate the **Do not resolve IP addresses to hostnames** checkbox. • Click on the **Trace** button. You will then receive an appropriate notification.

6.13.1.3 DNS Lookup



Support >> Tools >> DNS Lookup	
DNS Lookup	**Objective:** To establish which hostname belongs to a certain IP address or which IP address belongs to a certain hostname. **Procedure:** • Enter the IP address or hostname in the **Hostname** field. • Click on the **Lookup** button. You will then receive the answer queried by the mGuard according to the DNS configuration.

6.13.1.4 IKE Ping

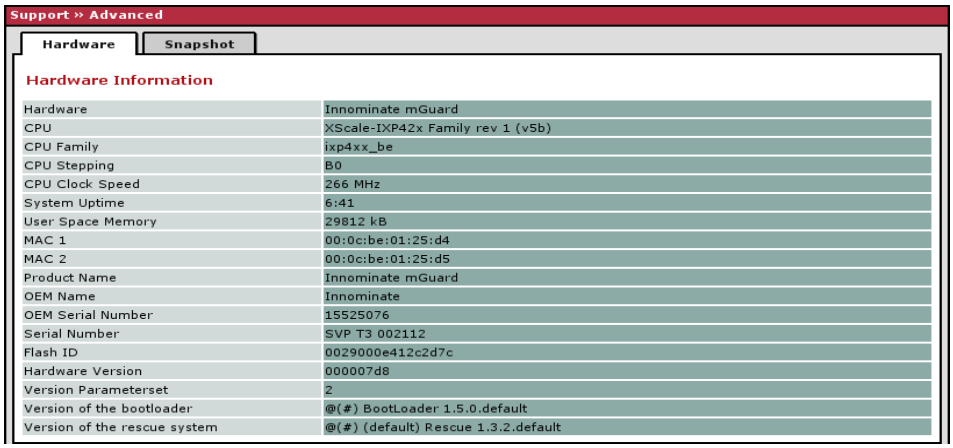


Support >> Tools >> IKE Ping	
IKE Ping	**Objective:** To determine if the VPN gateway software is able to establish a VPN connection, or if a firewall prevents this. **Procedure:** • Enter the name or the IP address of the VPN gateway in the **Hostname/IP Address** field. • Click on the **Ping** button. • You will then receive an appropriate notification.

6.13.2 Support >> Advanced

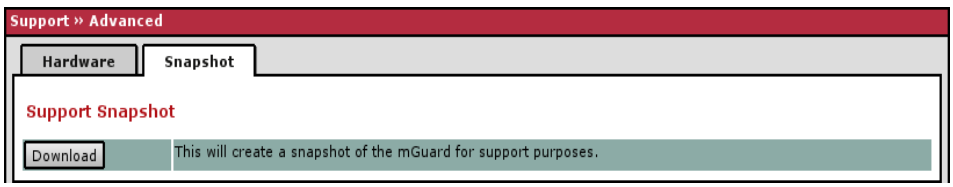
6.13.2.1 Hardware

This page lists the hardware properties of the mGuard.


Support » Advanced
Hardware
Snapshot
Hardware Information
Hardware | Innominate mGuard
CPU | XScale-IXP42x Family rev 1 (v5b)
CPU Family | ixp4xx_be
CPU Stepping | B0
CPU Clock Speed | 266 MHz
System Uptime | 6:41
User Space Memory | 29812 kB
MAC 1 | 00:0c:be:01:25:d4
MAC 2 | 00:0c:be:01:25:d5
Product Name | Innominate mGuard
OEM Name | Innominate
OEM Serial Number | 15525076
Serial Number | SVP T3 002112
Flash ID | 0029000e412c2d7c
Hardware Version | 000007d8
Version Parameterset | 2
Version of the bootloader | @(#) BootLoader 1.5.0.default
Version of the rescue system | @(#) (default) Rescue 1.3.2.default

6.13.2.2 Snapshot

This function is used for support purposes.



It creates a compressed file (in tar.gz format) containing all current configuration settings and log entries that could be relevant to error diagnosis.

This file does not contain any private information such as the private machine certificates or passwords. However, any Pre-Shared Keys of VPN connections are contained in snapshots.

To create a snapshot, please proceed as follows:

- Click on **Download**.
- Save the file (under the name snapshot.tar.gz).

Provide the file for support purposes, if required.

6.14 CIDR (Classless Inter-Domain Routing)

IP netmasks and CIDR are notations that combine several IP addresses into one address space. In this case, an address space with sequential addresses is treated as a network.

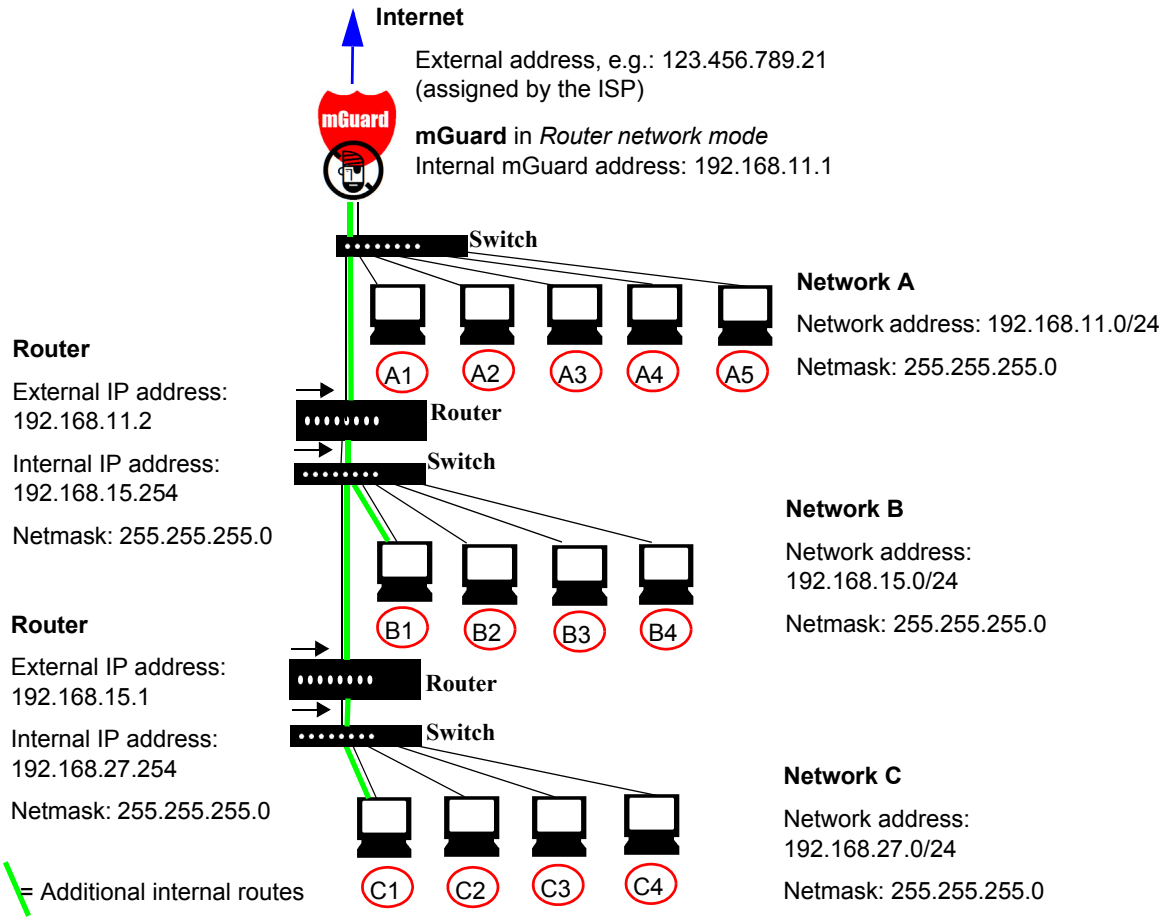
To define a range of IP addresses for the mGuard (e.g. when configuring the firewall), it may be necessary to use CIDR notation to specify the address space. The following table shows the IP netmask on the left and the corresponding CIDR notation on the right.

IP netmask	Binary	CIDR
255.255.255.255	11111111 11111111 11111111 11111111	32
255.255.255.254	11111111 11111111 11111111 11111110	31
255.255.255.252	11111111 11111111 11111111 11111100	30
255.255.255.248	11111111 11111111 11111111 11111000	29
255.255.255.240	11111111 11111111 11111111 11110000	28
255.255.255.224	11111111 11111111 11111111 11100000	27
255.255.255.192	11111111 11111111 11111111 11000000	26
255.255.255.128	11111111 11111111 11111111 10000000	25
255.255.255.0	11111111 11111111 11111111 00000000	24
255.255.254.0	11111111 11111111 11111110 00000000	23
255.255.252.0	11111111 11111111 11111100 00000000	22
255.255.248.0	11111111 11111111 11111000 00000000	21
255.255.240.0	11111111 11111111 11110000 00000000	20
255.255.224.0	11111111 11111111 11100000 00000000	19
255.255.192.0	11111111 11111111 11000000 00000000	18
255.255.128.0	11111111 11111111 10000000 00000000	17
255.255.0.0	11111111 11111111 00000000 00000000	16
255.254.0.0	11111111 11111110 00000000 00000000	15
255.252.0.0	11111111 11111100 00000000 00000000	14
255.248.0.0	11111111 11111000 00000000 00000000	13
255.240.0.0	11111111 11110000 00000000 00000000	12
255.224.0.0	11111111 11100000 00000000 00000000	11
255.192.0.0	11111111 11000000 00000000 00000000	10
255.128.0.0	11111111 10000000 00000000 00000000	9
255.0.0.0	11111111 00000000 00000000 00000000	8
254.0.0.0	11111110 00000000 00000000 00000000	7
252.0.0.0	11111100 00000000 00000000 00000000	6
248.0.0.0	11111000 00000000 00000000 00000000	5
240.0.0.0	11110000 00000000 00000000 00000000	4
224.0.0.0	11100000 00000000 00000000 00000000	3
192.0.0.0	11000000 00000000 00000000 00000000	2
128.0.0.0	10000000 00000000 00000000 00000000	1
0.0.0.0	00000000 00000000 00000000 00000000	0

Example: 192.168.1.0 / 255.255.255.0 corresponds to CIDR: 192.168.1.0/24

6.15 Example of a network

The following sketch illustrates how IP addresses can be distributed in a local network with subnetworks, which network addresses result and how the details regarding additional internal routes may look.



Network A	**Computer**	**A1**	**A2**	**A3**	**A4**	**A5**
	IP address	192.168.11.3	**192.168.11.4**	**192.168.11.5**	**192.168.11.6**	**192.168.11.7**
	Netmask	255.255.255.0	**255.255.255.0**	**255.255.255.0**	**255.255.255.0**	**255.255.255.0**
Network B	**Computer**	**B1**	**B2**	**B3**	**B4**	Additional internal routes: Network: 192.168.15.0/24 Gateway: 192.168.11.2 Network: 192.168.27.0/24 Gateway: 192.168.11.2
	IP address	192.168.15.2	**192.168.15.3**	**192.168.15.4**	**192.168.15.5**	
	Netmask	255.255.255.0	**255.255.255.0**	**255.255.255.0**	**255.255.255.0**	
Network C	**Computer**	**C1**	**C2**	**C3**	**C4**	
	IP address	192.168.27.1	**192.168.27.2**	**192.168.27.3**	**192.168.27.4**	
	Netmask	255.255.255.0	**255.255.255.0**	**255.255.255.0**	**255.255.255.0**	

7 Restarting, the Recovery Procedure and Flashing Firmware

The Rescue button is used to perform the following procedures on the devices shown in figure 7-1:

– Performing a restart
– Performing a recovery procedure
– Flashing the firmware / rescue procedure

Fig. 7-1 Rescue button

The mGuard centerport is equipped with a RESET button, which is used for restarting the system – see 3 “Control Elements and Displays”, “mGuard centerport” on page 3-1. On the mGuard centerport, the rescue procedure and subsequent reloading of the mGuard firmware is triggered in the boot menu.

7.1 Performing a restart

Objective

The device is restarted with the configured settings.

Action:

mGuard centerport: Press the RESET button.

On other mGuards, press the Rescue button for approx. 1.5 seconds:

- **mGuard industrial RS:** Until the error LED lights up
- **mGuard smart:** Until the middle LED lights up red
- **mGuard blade, mGuard PCI:** Until both red LEDs light up
- **mGuard EAGLE mGuard:** Until the status LED and the link LEDs are extinguished
- **mGuard delta:** Until the status LED stops blinking

Alternatively:

- Briefly disconnect the power supply.
- **mGuard PCI:** Restart the computer containing the mGuard PCI card.

7.2 Performing a recovery procedure

Objective

To reset the network configurations to the factory defaults, in case it is no longer possible to access the mGuard.

When carrying out the recovery procedure, the factory defaults are established for all mGuard models according to the following table:

Table 7-1 Address (according to factory default)

Factory default		
mGuard centerport	Router mode	https://192.168.1.1/
mGuard industrial RS	Stealth mode	https://1.1.1.1/
mGuard smart	Stealth mode	https://1.1.1.1/
mGuard PCI	Stealth mode	https://1.1.1.1/
mGuard blade	Stealth mode	https://1.1.1.1/
mGuard blade controller	Router mode	https://192.168.1.1/
EAGLE mGuard	Stealth mode	https://1.1.1.1/
mGuard delta	Router mode	https://192.168.1.1/

– The following applies for mGuard models reset in *Stealth* mode:
CIFS Integrity Monitoring is also switched off, as this only works when the Management IP is activated.
– MAU management for Ethernet connections is switched on. HTTPS access is approved via the local Ethernet connection (LAN).

The passwords, configured settings for VPN connections and the firewall are all retained.

Possible reasons for starting the Recovery procedure:

– The mGuard is in Router or PPPoE mode.
– The mGuard device address has been changed from the default setting.
– The current IP address of the device is unknown.

Action:

mGuard centerport:

Requirement: The monitor and keyboard are connected to the device.

- Press the following key combination on the keyboard: **Alt + SysRq + a**.

The “SysRq” key is sometimes not found on some keyboards. In this case, the “Print” key should be used.

After the recovery procedure has been carried out, a message is displayed on the monitor.

mGuard industrial RS, mGuard smart, mGuard blade, mGuard PCI, EAGLE mGuard, mGuard delta:

- Press the **Rescue** button slowly 6 times.

The mGuard responds after about two seconds:

mGuard industrial RS	If successful, the state LED lights up green If unsuccessful, the error LED lights up red
mGuard smart	If successful, the middle LED lights up green If unsuccessful, the middle LED lights up red
mGuard blade, mGuard PCI	If successful, the LAN LED lights up red If unsuccessful, the WAN LED lights up red
EAGLE mGuard	If successful, the status LED lights up yellow If unsuccessful, the error LED lights up red
mGuard delta	If successful, the status LED lights up green If unsuccessful, the status LED stays off

- Once again, press the **Rescue** button slowly 6 times.
- If successful, the device reboots after two seconds and switches to *Stealth* or *Router* mode. The device can then be accessed over the corresponding addresses (see table “Address (according to factory default)” on page 7-2).

7.3 Flashing the firmware / rescue procedure

Objective

To reload all mGuard firmware onto the device.

– **All configured settings are deleted.** The mGuard is restored to the factory default settings.
– From mGuard version 5.0.0 onwards, the licenses installed in the mGuard remain in place after flashing the firmware. They therefore do not need to be installed again.
– Only firmware from version 5.1.0 onwards can be installed on the mGuard industrial RS.

Possible reasons:

– The administrator and root password have been lost.

Requirements

Requirements – DHCP and TFTP server

ATTENTION: To flash firmware, a DHCP server and a TFTP or TFTP/BOOTP server must be installed on the locally connected computer. This does not apply to the mGuard centerport when the firmware is loaded from a USB mass storage device or a CD.

Install the DHCP and TFTP server, if necessary (see “Installing the DHCP and TFTP server” on page 7-9).

ATTENTION: The installation of a second DHCP server in a network can affect the configuration of the entire network.

Further requirements:

– On the **mGuard centerport:** The monitor and keyboard are connected to the device.

– The mGuard firmware has been copied from Innominate Support or from the website www.innominate.com and saved on the configuration computer.
– If your current firmware version is higher than the factory default of the device, then you must obtain the relevant license for using this update. This applies to major release upgrades, for example from version 4.x.y to version 5.x.y to version 6.x.y, etc.
– DHCP and TFTP servers can be accessed under the same IP address.
– **mGuard PCI:** When the mGuard is operated in **Power-over-PCI** mode, the DHCP/TFTP server must be connected to the mGuards LAN socket.
– **mGuard PCI:** When the mGuard is operated in PCI **Driver mode**, the DHCP/TFTP server must be operated on the computer or operating system provided by the interface to the mGuard.

Action

On the mGuard smart, mGuard PCI, mGuard blade, EAGLE mGuard, mGuard delta, mGuard industrial RS:

Proceed as follows to flash the firmware or carry out the rescue procedure:

ATTENTION: Do not disconnect the power supply to the mGuard during the flashing procedure! The device could be damaged and may be left inoperable. This will require the device to be reactivated by the manufacturer.

- Keep the **Rescue** button pressed until the *Recovery* status is entered as follows:
  The mGuard is restarted (after approx. 1.5 seconds). After another 1.5 seconds the mGuard enters the *Recovery* status mode:
  The device reaction depends on the model:

mGuard industrial RS	The “State”, “LAN” and “WAN” LEDs light up green
mGuard smart	The LEDs light up green
mGuard blade, **mGuard PCI**	The green LEDs and red “LAN” LED light up
EAGLE mGuard	The “1”, “2” and “V.24” LEDs light up
mGuard delta	The status LED fades slowly

- **Release the Rescue button not later than one second after the** *Recovery status* **is reached.**
  The mGuard restarts if the **Rescue** button is not released quickly enough.
  The mGuard will now start the Recovery system: It searches for a DHCP server over the LAN port in order to obtain an IP address.
  The device reaction depends on the model:

mGuard industrial RS	The “State” LED flashes
mGuard smart	The middle LED (heartbeat) flashes
mGuard blade, **mGuard PCI**	The red “LAN” LED flashes
EAGLE mGuard	The “1”, “2” and “V.24” LEDs light up orange
mGuard delta	The status LED flashes

  The “install.p7s” file is loaded from the TFTP server. This contains the electronically authenticated control procedure for the installation process. Only files signed by Innominate are executed.
  The control procedure now deletes the current flash memory contents and prepares for a new firmware installation.

The device reaction depends on the model::

mGuard industrial RS	The “Modem”, “State” and “LAN” LEDs form a light sequence
mGuard smart	The three green LEDs form a light sequence
mGuard blade, **mGuard PCI**	The green LEDs and the red LAN LED form a light sequence
EAGLE mGuard	The “1”, “2” and “V.24” LEDs form a light sequence
mGuard delta	The status LED flashes at a faster rate

The “jffs2.img.p7s” firmware file is downloaded from the TFTP server and written onto the flash memory. This file contains the actual mGuard operating system and is signed electronically. Only files signed by Innominate are accepted.
This process takes around 3 to 5 minutes.

The device reaction depends on the model:

mGuard industrial RS	The “State” LED lights up continuously
mGuard smart	The middle LED (heartbeat) lights up continuously
mGuard blade, **mGuard PCI**	The green LEDs flash and the red LAN LED lights up continuously
EAGLE mGuard	The “1”, “2” and “V.24” LEDs are out, the “p1”, “p2” and “Status” LEDs light up green continuously
mGuard delta	The status LED lights up continuously

The new firmware is unpacked and configured. This takes between 1 and 3 minutes.

As soon as the procedure has been completed, the following occurs:

mGuard industrial RS	The “Modem”, “State” and “LAN” LEDs flash green simultaneously
mGuard smart	All three LEDs flash green simultaneously
mGuard blade	The green “WAN” LED, green “LAN” LED and red “WAN” LED flash simultaneously
mGuard PCI	The mGuard reboots
EAGLE mGuard	The “1”, “2” and “V.24” LEDs flash green simultaneously
mGuard delta	The status LED flashes once per second

- Restart the mGuard. This is not necessary for the mGuard blade and mGuard PCI.
- To do this, press the **Rescue** button briefly.
  (Alternatively, you can disconnect and reconnect the power supply. On the mGuard smart, you can remove and insert the USB cable as it is only used for the power supply.)

The mGuard is restored to its factory settings. You can now configure it again (see “Setting up a local configuration connection” on page 5-8).

Action

On the mGuard centerport:

Proceed as follows to flash the firmware or carry out the rescue procedure:

ATTENTION: Do not disconnect the power supply to the mGuard during the flashing procedure! The device could be damaged and may be left inoperable. This will require the device to be reactivated by the manufacturer.

1. Restarting / booting the mGuard centerport
2. As soon as the boot menu of the mGuard centerport is shown on the monitor, press one of the arrow keys on the keyboard: ↑, ↓, ← or →.
   The boot menu then remains on display.

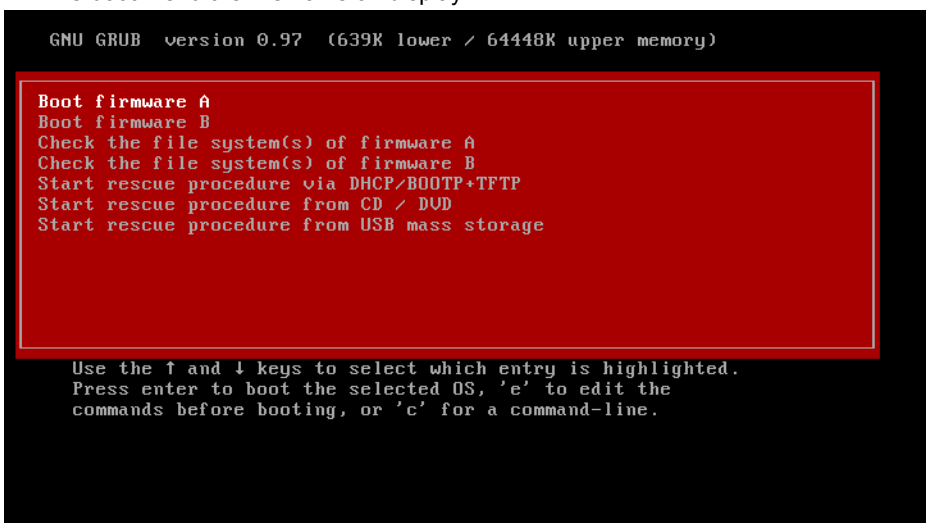

GNU GRUB version 0.97 (639K lower / 64448K upper memory)
Boot firmware A
Boot firmware B
Check the file system(s) of firmware A
Check the file system(s) of firmware B
Start rescue procedure via DHCP/BOOTP+TFTP
Start rescue procedure from CD / DVD
Start rescue procedure from USB mass storage
Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, or 'c' for a command-line.

Fig. 7-2 mGuard centerport boot menu

3. Select one of the options for carrying out the rescue procedure using the ↓ or ↑ arrow keys:
   Start rescue procedure via DHCP / BOOTP+TFTP
   OR
   Start rescue procedure from CD / DVD
   OR
   Start rescue procedure from USB mass storage
   Press **Enter** to apply your selection.

   Contained in the options:

Start rescue procedure via DHCP / BOOTP+TFTP

Result: The mGuard loads all necessary files from the TFTP server. The names of the downloaded files correspond to those also used by the other mGuard models, with the following exceptions:

– install.p7s -> install.x86.p7s
– jffs2.img.p7s -> firmware.img.x86.p7s

When using the install.x86.p7s file, ensure that it corresponds to the file version approved by Innominate for using the rescue procedure via TFTP.

Start rescue procedure from CD / DVDs

Requirement: The mGuard firmware has been burned onto a CD – see below under “Burning mGuard firmware onto a CD” on page 7-7.

Result: The mGuard loads all necessary files from the inserted CD.
To do this, insert the CD containing the mGuard firmware into the CD drive whilst the boot menu is displayed before making your selection.
For security reasons, the mGuard centerport does not boot from the CD.

Start rescue procedure from USB mass storage

Requirement: The mGuard firmware has been copied onto a USB storage medium (USB stick).
The USB storage medium must have a “vfat” file system on the initial primary partition, and the same files must be found in the same folders as defined for the CD.
Additionally, the files can be contained in the **Rescue Config** folder (as for a CD).
Result: The mGuard loads all necessary files from the connected USB storage medium.
To do this, connect the USB storage medium containing the firmware into the USB port whilst the boot menu is displayed before making your selection.
(For security reasons, the mGuard centerport does not boot from the USB storage medium.)

4. After the rescue procedure has been carried out, a message is displayed on the monitor. Follow any further instructions which appear on the monitor.

The mGuard is restored to its factory settings. You can now configure it again (see “Setting up a local configuration connection” on page 5-8):

Burning mGuard firmware onto a CD

The mGuard firmware can be burned onto a CD. A ZIP file is available in the download area under www.innominate.com.

Burn the contents of this ZIP archive as a data CD. The following files must be found in the following folders / under the following path names on the CD:

– Firmware/install.x86.p7s
– Firmware/firmware.img.x86.p7s

When using the install.x86.p7s file, ensure that it corresponds to the file version approved by Innominate for using the rescue procedure via CD.

If required, the following files can also be contained in the **Rescue Config** folder on the CD:

Rescue Config/licence.lic	License file imported to the device during the rescue procedure.
Rescue Config/<serial>.lic	As above, but the <serial> placeholder is replaced by the device serial number. The same CD can then be used simultaneously for various devices.
Rescue Config/preconfig.atv	Configuration profile used in the firmware during the rescue procedure. The file must be used by the “Rescue Config/preconfig.sh” script (see below).
Rescue Config/<serial>.atv	Same as <serial>.lic
Rescue Config/preconfig.sh	Script file executed immediately after installation of the new firmware. More details can be found in “Innominate mGuard – Application Note: Rollout Support”, which is available from the Innominate website (www.innominate.com).

7.3.1 Installing the DHCP and TFTP server

ATTENTION: The installation of an additional DHCP server in a network can affect the configuration of the entire network.

In Windows

Install the program, which can be found in the download area under www.innominate.com.

- Disconnect the Windows computer from all networks.
- Copy the firmware into any empty folder on the Windows computer.
- Start the TFTPD32.EXE program.

The set host IP is: **192.168.10.1.** This must also be the network card address.

- Click on **Browse** to switch to the folder where the mGuard image files have been saved: **install.p7s, jffs2.img.p7s**
- If a major release upgrade of the firmware is carried out due to the flash procedure, the license file purchased for the update must also be stored here under the name **licence.lic**

  Ensure that this is the correct license file for the device (see “Management >> Update” on page 6-31).

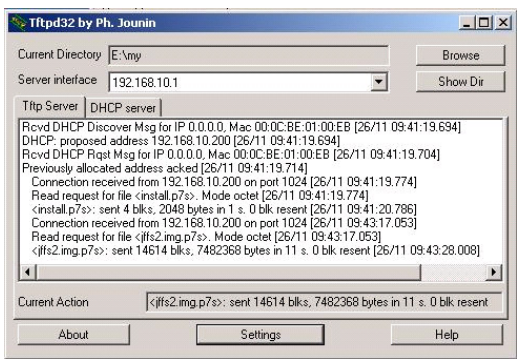
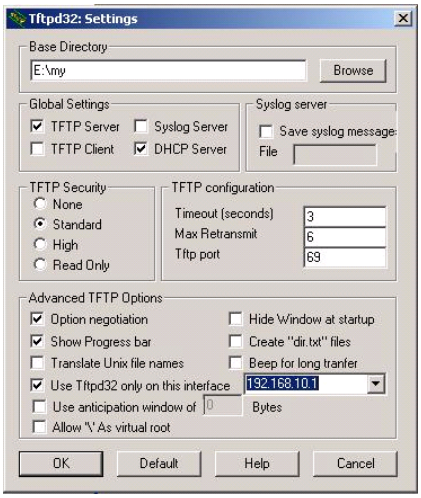

Tftpd32 by Ph. Jounin
Current Directory
E:\my
Browse
Server interface
192.168.10.1
Show Dir
Tftp Server
DHCP server
Rcvd DHCP Discover Msg for IP 0.0.0.0, Mac 00:0C:BE:01:00:EB [26/11 09:41:19.694]
DHCP: proposed address 192.168.10.200 [26/11 09:41:19.694]
Rcvd DHCP Rqst Msg for IP 0.0.0.0, Mac 00:0C:BE:01:00:EB [26/11 09:41:19.704]
Previously allocated address acked [26/11 09:41:19.714]
Connection received from 192.168.10.200 on port 1024 [26/11 09:41:19.774]
Read request for file <install.p7s>. Mode octet [26/11 09:41:19.774]
<install.p7s>: sent 4 blks, 2048 bytes in 1 s. 0 blk resent [26/11 09:41:20.786]
Connection received from 192.168.10.200 on port 1024 [26/11 09:43:17.053]
Read request for file <jffs2.img.p7s>. Mode octet [26/11 09:43:17.053]
<jffs2.img.p7s>: sent 14614 blks, 7482368 bytes in 11 s. 0 blk resent [26/11 09:43:28.008]
Current Action
<jffs2.img.p7s>: sent 14614 blks, 7482368 bytes in 11 s. 0 blk resent
About
Settings
Help

Fig. 7-3 Entering the host IP

- Go to the “TFTP server” or “DHCP server” tab page and click on “Settings” to set the parameters as follows:



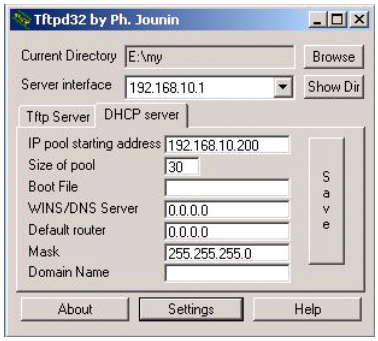


Fig. 7-4 Settings

In Linux

All current Linux distributions include DHCP and TFTP servers.

- Install the corresponding packages as described in the instructions for the respective distributions.
- Configure the DHCP server by making the following settings in the **/etc/dhcpd.conf** field:

  subnet 192.168.134.0 netmask 255.255.255.0 {
  range 192.168.134.100 192.168.134.119;
  option routers 192.168.134.1;
  option subnet-mask 255.255.255.0;
  option broadcast-address 192.168.134.255;}

This sample configuration makes 20 IP addresses (.100 to .119) available. It is assumed that the DHCP server has the address 192.168.134.1 (settings for ISC DHCP 2.0).

The required TFTP server is configured in the following file: **/etc/inetd.conf**

- In this file, insert the appropriate lines or set the necessary parameter for TFTP service. (The directory for the data is: **/tftpboot)**

  tftp dgram udp wait root /usr/sbin/in.tftpd -s /tftpboot/

The mGuard image files must be saved in the **/tftpboot** directory:
install.p7s, jffs2.img.p7s

- If a major release upgrade of the firmware is carried out due to the flash procedure, the license file purchased for the update must also be stored here under the name **licence.lic**.

  Ensure that this is the correct license file for the device (see “Management >> Update” on page 6-31).
- Restart the “inetd” process again to activate the modified configuration.
- If you use a different process (e.g. xinetd), please consult the appropriate documentation.

8 Glossary

AES

The AES (Advanced Encryption Standard) was developed by NIST (National Institute of Standards and Technology) in cooperation with the industry. This symmetrical encryption standard was developed to replace the earlier DES standard. AES specifies three different key lengths (128, 192 and 256 bits).

In 1997, NIST started the AES initiative and announced its conditions for the algorithm. From the many proposed encryption algorithms, NIST selected a total of five algorithms for closer examination – the MARS, RC6, Rijndael, Serpent and Twofish algorithms. In October 2000, the Rijndael algorithm was adopted as the encryption algorithm.

Asymmetrical encryption

In asymmetrical encryption, data is encrypted with one key and decrypted with a second key. Both keys are suitable for encryption and decryption. One of the keys is kept secret by its owner (Private Key), whilst the other is made available to the public (Public Key), i.e. to possible communication partners.

A message encrypted with the public key can only be decrypted and read by the owner of the associated private key. A message encrypted with the private key can be decrypted by any recipient who is the owner of the associated public key. Encryption using the private key shows that the message actually originated from the owner of the associated public key. Therefore, the expression “digital signature” is also often used.

However, asymmetrical encryption techniques such as RSA are both slow and susceptible to certain types of attack, meaning they are often combined with some form of symmetrical encryption (→ “Symmetrical encryption” on page 8-7). On the other hand, concepts are available which avoid the additional administration of symmetrical keys.

CA certificate

Used to check the reliability of a certificate and the CA (Certificate Authority) that issued it (→ “X.509 Certificate” on page 8-8). A CA certificate can be consulted in order to check that a certificate signature has this CA. This check only makes sense if there is little doubt that the CA certificate originates from an authentic source (i.e. is also authentic). If doubt occurs, then the CA certificate itself can be checked. If (as is usually the case) this applies to a sub-CA certificate (i.e. a CA certificate issued by a sub-certificate authority), then the CA certificate of the superordinate CA can be used to check the CA certificate of the subordinate instance. If a superordinate CA certificate also has a superordinate CA certificate, then its CA certificate can be used to check the CA certificate of the subordinate instance. This chain of trust continues down to the root instance (root CA). The CA file of the root CA is necessarily self-signed. This instance is the highest available, and is ultimately the basis of trust. No-one else can certify that this instance is actually the instance in question. A root CA is therefore a state or state-controlled organization.

The mGuard can use its imported CA certificate to check the validity of displayed certificates from remote peers. For example, with VPN connections the authentication of remote peers can only be made using the CA certificate. In this case, all CA certificates must be installed in mGuard in order to build a chain with the certificate displayed by the remote peer: Aside from the CA certificate, whose signature can be seen in the displayed certificate of the VPN partner to be checked, the CA certificate of the superordinate CA up to the root certificate must also be used. If this “trust chain” is checked meticulously in order to accept the authenticity of a remote peer, then the level of security increases.

Client / Server

In a client-server environment, a server is a program or computer which accepts and answers queries from client programs or computers.

In data communication, the computer which establishes a connection to a server (or host) is also called a client. In other words, the client is the calling computer and the server (or host) is the computer called.

Datagram

In the IP protocol, data is sent in the form of data packets. These are known as IP datagrams. An IP datagram has the following structure:

IP Header	TCP, UDP, ESP etc. Header	Data (Payload)

The IP header contains:

– The IP address of the sender (source IP address)
– The IP address of the recipient (destination IP address)
– The protocol number of the protocol on the superordinate protocol layer (according to the OSI layer model)
– The IP header checksum used to check the integrity of the received header

The TCP/UDP header contains the following information:

– The sender's port (source port)
– The recipient's port (destination port)
– A checksum covering the TCP header and information from the IP header (e.g. source and destination IP addresses)

Default route

If a computer is connected to a network, the operating system creates a routing table internally. It lists the IP addresses that the operating system has identified based on the connected computers and the routes available at that moment. The routing table thus contains the possible routes (destinations) for sending IP packets. If IP packets are to be sent, the computer's operating system compares the IP addresses stated in the IP packets with the entries in the routing table in order to determine the correct route.

If a router is connected to the computer and its internal IP address (i.e. the IP address of the router's LAN port) has been relayed to the operating system as the standard gateway (in the network card's TCP/IP configuration), then this IP address is used as the destination if all other IP addresses in the routing table are not suitable. In this case, the IP address of the router specifies the default route as all IP packets whose IP address have no counterpart in the routing table (i.e. cannot find a route) are directed to this gateway.

DES / 3DES

The DES symmetrical encryption algorithm (→ "Symmetrical encryption" on page 8-7) was developed by IBM and checked by the NSA. It was set in 1977 by the American National Bureau of Standards, which was the predecessor of the National Institute of Standards and Technology (NIST), as the standard for American governmental institutions. As this was the very first standardized encryption algorithm, it quickly won acceptance in industrial circles, both inside and outside America.

DES uses a 56 bit key length, which is no longer considered secure as the available processing power has greatly increased since 1977.

3DES is a variant of DES. It uses keys that are three times as long, i.e. 168 bits long. This is still considered to be secure and is also included in the IPsec standard.

DynDNS provider

Also known as *Dynamic DNS provider*. Every computer connected to the Internet has an IP address (IP = Internet Protocol). If the computer accesses the Internet via a dial-up modem, ISDN or ADSL, its ISP will assign it a dynamic IP address. In other words, the address changes for each online session. Even if the computer is online 24 hours a day without interruption (e.g. flat-rate), the IP address will change during the session.

If a computer such as this is to be accessible via the Internet, it must have an address that is known to the remote peer. This is the only way to establish a connection to the computer. If the address of the computer changes constantly, then this is not possible. The exception to this is when the operator of the computer has an account with a Dynamic DNS provider (DNS = Domain Name Server).

In this case, the operator can set a host name with this provider under which the system should be accessible: e.g. www.example.com. The Dynamic DNS provider also provides a small program that must be installed and run on the affected computer. At each new Internet session, this tool informs the Dynamic DNS provider which IP address the local computer has currently been assigned. The Domain Name Server registers the current assignment of host name to IP address and also informs the other Domain Name Servers over the Internet.

If a remote system now wishes to establish a connection to a system that is registered with the DynDNS provider, then the remote system can use the host name of the system as its address. This will establish a connection to the responsible DNS (Domain Name Server) in order to look up the IP address that is currently registered for this host name. The corresponding IP address is sent back from the DNS to the remote system, which can then use this as the destination address. This now leads directly to the desired computer.

All Internet addresses are based on this procedure: First, a connection to a DNS is established in order to determine the IP address assigned for the host name. Once this has been accomplished, the established IP address is used to set up a connection to the desired remote peer, which could be any site on the Internet.

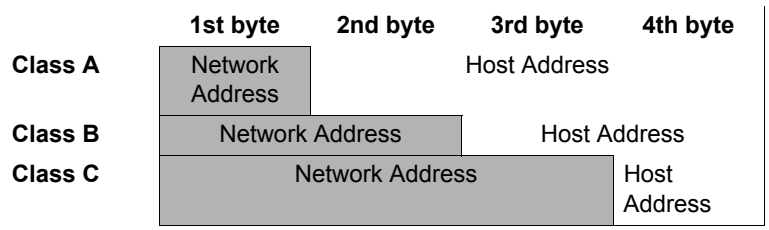
IP address

Every host or router on the Internet / Intranet has a unique IP address (IP = Internet Protocol). An IP address is 32 bits (= 4 bytes) long and is written as four numbers (each from 0 to 255), which are separated by a dot.

An IP address consists of 2 parts: the network address and the host address.

Network Address	Host Address

All network hosts have the same network address, but different host addresses. The two parts of the address differ in length depending on the size of the respective network (networks are categorized as Class A, B or C):



The first byte of the IP address determines whether the IP address of a network device belongs to Class A, B or C. The following has be specified:

	Value of 1st byte	No. of the bytes for the network address	No. of bytes for the host address
Class A	1–126	1	3
Class B	128–191	2	2
Class C	192–223	3	1

There is thus a maximum worldwide total of 126 Class A networks. Each of these networks can have a maximum of 256 x 256 x 256 hosts (3 bytes of address space). There can be 64 x 256 Class B networks and each of these networks can have up to 65,536 hosts (2 bytes address space: 256 x 256). There can be 32 x 256 x 256 Class C networks and each of these networks can have up to 256 hosts (1 byte address space).

Subnet mask

Normally, a company network with access to the Internet is only officially assigned a single IP address, e.g. 123.456.789.21. Based on the first byte of this sample address, one can see that this company network is a Class B network. This means that the last 2 bytes are free to be used for host addresses. This produces an address space for up to 65,536 possible hosts (256 x 256).

Such a huge network is not practical. There is a need to build subnetworks here. The subnet mask can be used for this. Like an IP address, this mask is 4 bytes long. The bytes that represent the network address are each assigned the value 255. This can mainly be used to “borrow” a portion of the host address that can then be used to address the subnetworks. In this example, by using the subnet mask 255.255.255.0 in a Class B network (2 bytes for the network address, 2 bytes for the host address), the third byte, which was actually intended for host addressing, can now be used for subnet addressing. With this configuration, the company network could support 256 subnetworks that each have 256 hosts.

IPsec

IP Security (IPsec) is a standard that uses encryption to verify the authenticity of the sender and to ensure the confidentiality and integrity of the data in IP datagrams (→ “Datagram” on page 8-2). The components of IPsec are the Authentication Header (AH), the Encapsulating Security Payload (ESP), the Security Association (SA) and the Internet Key Exchange (IKE).

At the start of the session, systems that wish to communicate must determine which technique should be used and the implications of this choice for the session e.g. *Transport Mode* or *Tunnel Mode*.

In *Transport Mode*, an IPsec header is inserted between the IP header and the TCP or UDP header respectively in each IP datagram. Since the IP header remains unchanged, this mode is only suitable for host- to-host connections.

In *Tunnel Mode*, an IPsec header and a new IP header are added in front of the entire IP datagram. This means the original datagram is encrypted in its entirety and stored in the payload of the new datagram.

The *Tunnel Mode* is used in VPN applications: The devices at the tunnel ends ensure that the datagrams are encrypted before they pass through the tunnel. This means the actual datagrams are completely protected whilst being transferred over a public network.

NAT (Network Address Translation)

During Network Address Translation (NAT) (also known as *IP Masquerading*), an entire network is “hidden” behind a single device, known as a NAT router. If you communicate externally via a NAT router, the internal computers in the local network and their IP addresses remain hidden. The remote communication partner will only see the NAT router with its own IP address.

In order to allow internal computers to communicate directly with external systems (over the Internet), the NAT router must modify the IP datagrams that are passed to and from the internal computers and the remote peers.

If an IP datagram is sent from the internal network to a remote peer, the NAT router modifies the UDP and TCP headers of the datagram. It replaces the source IP address and port with its own IP address and an unused port. A table is stored in which the original values are listed together with the corresponding new ones.

When a reply datagram is received, the NAT router will recognize that it is intended for an internal computer using the destination port of the datagram. Using the table, the NAT router will replace the destination IP address and port and then forward the datagram on via the internal network.

PPPoE

PPPoE is an acronym of **P**oint-to-**P**oint **P**rotocol **o**ver **E**thernet. This protocol is based on PPP and Ethernet standards. PPPoE defines how to connect users via Ethernet with the Internet via a jointly used broadband medium such as DSL, wireless LAN or a cable modem.

PPTP

PPTP is an acronym of **P**oint-to-**P**oint **T**unneling **P**rotocol. This protocol was developed by companies such as Microsoft and U.S. Robotics in order to securely transfer data between VPN nodes (→ VPN) via a public network.

Port number

A port number is assigned to each UDP and TCP protocol participant. It is then possible to differentiate two UDP or TCP connections between two systems and use them at the same time.

Fixed port numbers can be reserved for special purposes. For example, HTTP connections are usually assigned to TCP port 80 and POP3 connections to port 110.

Protocol, communication protocol

Devices that communicate with each other must follow the same rules. To do this, they must “speak” the same language. Rules and standards of this kind are called protocols or communication protocols. Some of the more frequently used protocols are IP, TCP, PPP, HTTP and SMTP.

Proxy

A proxy is an intermediary service. A web proxy (e.g. Squid) is often used for a large network. For example, if 100 employees access a certain website at the same time over a web proxy, then the proxy only loads the relevant web pages once from the server and then distributes them as needed amongst the employees. Remote web traffic is reduced, which saves money.

Router

A router is a device that is connected to different IP networks and communicates between them. To do this, a router has an interface for each network connected to it. A router must find the correct path to the target for incoming data and must define the appropriate interface for forwarding it. It takes data from a local routing table that shows which networks are available over which router connections (or intermediary stations).

Service provider

Service providers are companies or institutions that enable users to access the Internet or online services.

Spoofing, anti-spoofing

In Internet terminology, spoofing means supplying a false address. Using this false Internet address, a user can create the illusion of being an authorized user.

Anti-spoofing is the term for mechanisms that detect or prevent spoofing.

Subject, certificate

In a certificate, the classification of a certificate to its owner is confirmed by a CA (Certificate Authority). This occurs through the confirmation of certain owner characteristics. Furthermore, the certificate owner must possess the private key that matches the public key in the certificate (→ “X.509 Certificate” on page 8-8).

Example:

```
Certificate:
   Data:
      Version: 3 (0x2)
      Serial Number: 1 (0x1)
      Signature Algorithm: md5WithRSAEncryption
      Issuer: C=XY, ST=Austria, L=Graz, O=TrustMe Ltd, OU=Certificate Authority, CN=CA/Email=ca@trustme.dom
      Validity
         Not Before: Oct 29 17:39:10 2000 GMT
→     Subject: CN=anywhere.com,E=doctrans.de,C=DE,ST=Hamburg,L=Hamburg,O=Innominate,OU=Security
      Subject Public Key Info:
         Public Key Algorithm: rsaEncryption
         RSA Public Key: (1024 bit)
            Modulus (1024 bit):
               00:c4:40:4c:6e:14:1b:61:36:84:24:b2:61:c0:b5:
               d7:e4:7a:a5:4b:94:ef:d9:5e:43:7f:c1:64:80:fd:
               9f:50:41:6b:70:73:80:48:90:f3:58:bf:f0:4c:b9:
               90:32:81:59:18:16:3f:19:f4:5f:11:68:36:85:f6:
               1c:a9:af:fa:a9:a8:7b:44:85:79:b5:f1:20:d3:25:
               7d:1c:de:68:15:0c:b6:bc:59:46:0a:d8:99:4e:07:
               50:0a:5d:83:61:d4:db:c9:7d:c3:2e:eb:0a:8f:62:
               8f:7e:00:e1:37:67:3f:36:d5:04:38:44:44:77:e9:
               f0:b4:95:f5:f9:34:9f:f8:43
            Exponent: 65537 (0x10001)
      X509v3 extensions:
         X509v3 Subject Alternative Name:
            email:xyz@anywhere.com
         Netscape Comment:
            mod_ssl generated test server certificate
         Netscape Cert Type:
            SSL Server
   Signature Algorithm: md5WithRSAEncryption
      12:ed:f7:b3:5e:a0:93:3f:a0:1d:60:cb:47:19:7d:15:59:9b:
      3b:2c:a8:a3:6a:03:43:d0:85:d3:86:86:2f:e3:aa:79:39:e7:
      82:20:ed:f4:11:85:a3:41:5e:5c:8d:36:a2:71:b6:6a:08:f9:
      cc:1e:da:c4:78:05:75:8f:9b:10:f0:15:f0:9e:67:a0:4e:a1:
      4d:3f:16:4c:9b:19:56:6a:f2:af:89:54:52:4a:06:34:42:0d:
      d5:40:25:6b:b0:c0:a2:03:18:cd:d1:07:20:b6:e5:c5:1e:21:
      44:e7:c5:09:d2:d5:94:9d:6c:13:07:2f:3b:7c:4c:64:90:bf:
      ff:8e
```

The *Subject Distinguished Name* (or *Subject*) clearly identifies the certificate owner. The entry is comprised of several components. These are known as attributes (see the sample certificate above). The following table contains a list of possible attributes. The sequence of attributes in a X.509 certificate can vary.

Table 8-1 X.509 Certificate

Abbreviation	Name	Explanation
CN	Common Name	Identifies the person or object that the certificate belongs to. Example: CN=server1
E	E-mail address	Shows the e-mail address of the certificate owner.
OU	Organizational Unit	Shows the department within an organization or company. Example: O=Development
O	Organization	Shows the organization or company. Example: O=Innominate
L	Locality	Shows the place / locality Example: L=Hamburg
ST	State	Shows the federal state / county. Example: ST=Bavaria
C	Country	Two-letter code that identifies the country (Germany = DE) Example: C=DE

A filter can be set for the subject (i.e. certificate owner) during VPN connections and remote service access to the mGuard by SSH or HTTPS. After this, only certificates from remote peers are accepted that have certain attributes in the subject line.

Symmetrical encryption

In symmetrical encryption, the same key is used to encrypt and decrypt data. Two examples of symmetrical encryption algorithms are DES and AES. They are fast, but also difficult to administrate as the number of users increases.

TCP/IP (Transmission Control Protocol / Internet Protocol)

These are network protocols used to connect two computers over the Internet.

IP is the base protocol.

UDP is based on IP and sends individual packets. The packets may arrive at the recipient in an different order in which they were sent or they may even be lost.

TCP is used for connection security and ensures, for example, that data packets are passed on to the application in the correct order.

UDP and TCP add port numbers between 1 to 65535 to the IP addresses. These distinguish the various services offered by the protocols.

A number of additional protocols are based on UDP and TCP, e.g. HTTP (HyperText Transfer Protocol), HTTPS (Secure Hyper Text Transfer Protocol), SMTP (Simple Mail Transfer Protocol), POP3 (Post Office Protocol, Version 3) and DNS (Domain Name Service).

ICMP is based on IP and contains control messages.

SMTP is an e-mail protocol based on TCP.

IKE is an IPsec protocol based on UDP.

ESP is an IPsec protocol based on IP.

On a Windows PC, the WINSOCK.DLL (or WSOCK32.DLL) handles the development of both protocols.

(→ “Datagram” on page 8-2)

Trap

Aside from other protocols, an SNMP (Simple Network Management Protocol) can also be used, especially in large networks. This UDP-based protocol is used for the central administration of network devices. For example, the configuration of a device can be requested using the “GET” order and changed using the “SET” order. To do this, the requested network device must be SNMP compatible.

An SNMP-compatible device can also send SNMP messages (e.g. when unexpected events occur). Messages of this kind are known as SNMP traps.

VLAN

A VLAN (Virtual Local Area Network) divides a physical network into several independent logical networks.

Devices of different VLANs can only access devices within their own VLAN. Assignment to a VLAN is no longer defined by the network topology alone, but also by the configured VLAN ID.

VLAN settings can also be used as optional settings for each IP. A VLAN is identified by its VLAN ID (1-4094). All devices with the same VLAN ID belong to the same VLAN and can therefore communicate with each other.

The Ethernet packet for a VLAN (based on IEEE 802.1Q) is extended by 4 bytes, with 12 bits available for recording the VLAN ID. The VLAN IDs “0” and “4095” are reserved and cannot be used for VLAN identification.

VPN (Virtual Private Network)

A **V**irtual **P**rivate **N**etwork (VPN) connects several separate private networks (subnetworks) together via a public network (e.g. the Internet) to form a single joint network. A cryptographic protocol is used to ensure confidentiality and authenticity. A VPN thus offers an economical alternative to using dedicated lines to build a nationwide corporate network.

X.509 Certificate

A type of “seal” that certifies the authenticity of a public key (→ Asymmetrical encryption) and the associated data.

It is possible to use certification to enable the user of the public key (used to encrypt the data) to ensure that the received public key is from its actual issuer (and thus from the instance that should later receive the data). A *Certification Authority (CA)* certifies the authenticity of the public key and the associated link between the identity of the issuer and their key. The certification authority will verify authenticity in accordance with its rules. For example, this may require the issuer of the public key to appear before it in person. Once successfully authenticated, the CA adds its digital signature to the issuer’s public key. This results in a certificate.

An X.509(v3) certificate is thus comprised of a public key, information about the key owner (given as Distinguished Name (DN)), authorized usage etc. and the signature of the CA (→ Subject, certificate).

The signature is created as follows: The CA creates an individual bit sequence, known as the HASH value, from the bit sequence of the public key, owner information and other data. This sequence may be up to 160 bits long. The CA then encrypts this with its own private key and then adds it to the certificate. The encryption with the CA’s private key proves the authenticity of the certificate (i.e. the encrypted HASH string is the CA’s digital signature). If the certificate data is altered, then this HASH value will no longer be correct and the certificate is then worthless.

The HASH value is also known as the fingerprint. Since it is encrypted with the CA’s private key, anyone who has the corresponding public key can decrypt the bit sequence and thus verify the authenticity of the fingerprint or signature.

The usage of a certification authority means it is not necessary for key owners to know each other. They must only know the certification authority used in the process. The additional key information further simplifies administration of the key.

X.509 certificates can be used for e-mail encryption with S/MIME or IPsec.

9 Technical Data

General	
CPU	Intel IXP 42x with 266 MHz or 533 MHz mGuard centerport: Multicore x86 processor architecture
Memory	16 MB Flash, 64 MB SDRAM; mGuard delta: 128 MB; mGuard centerport: 1 x HDD
LAN and WAN interfaces	Ethernet IEEE 802 10/100 Mbps RJ45 mGuard centerport: Ethernet IEEE 802.3 10 / 100 / 1000 Base-TX, RJ45, Full and Half-Duplex, Auto-MDIX
Serial	RS 232 mGuard centerport: VGA console, 2 x RS 232
Power supply	mGuard smart: Via USB interface (5 V, 500 mA) or external power supply unit (110–230 V) mGuard delta: 5 V DC, 3 A
Operating system	Innominate Embedded Linux
Operation supervision	Watchdog and LEDs
Relative humidity	mGuard blade, mGuard smart, mGuard PCI: Maximum 90% (non-condensing) mGuard delta: 5% to 95% (non-condensing)
Ambient temperature	mGuard smart, mGuard blade, mGuard delta: 0°C to +40°C mGuard PCI: 0°C to +70°C
mGuard centerport	
Power supply	2 x 100 – 240 V AC, 250 W, redundant
Ambient temperature	–20°C to +70°C (when not in operation) 0°C to + 50°C (in operation)
Relative humidity	10–90% (when not in operation) 20–90% (in operation)
Protection class	Front IP20
Dimensions (H x W x D)	88 x 482 x 472 mm (2U x 19" x 18.58")
Weight	approx. 10 kg
Conformity and approval	CE, developed according to UL requirements
mGuard industrial RS	
Network size	Length of a 10BASE-T/100BASE-TX twisted pair segment (approx. 100 m)
Operating voltage	9 V DC to 36 V DC; maximum transient overvoltage of 1500 V
Potential difference between input voltage and housing	36 V DC
Power consumption	Maximum 4 W at 24 V DC
Current overload protection at input	Non-changeable fuse

mGuard industrial RS	
Dimensions (W x H x D)	45 mm x 100 mm x 111 mm
Weight	250 g
Ambient temperature	0°C to +55°C
Relative humidity	10% to 95% (non-condensing)
Pollution degree	2

EAGLE mGuard	
Network size	Length of a 10BASE-T/100BASE-TX twisted pair segment (approx. 100 m)
Operating voltage	NEC Class 2 power source 12 V DC or 9.6 V DC to 60 V DC or 18 V AC to 30 V AC Safety extra-low voltage (SELV/PELV, decoupled redundant entries), max. 5 A Buffer time: Min. 10 ms at 24 V DC
Potential difference between input voltage and housing	Potential difference to input voltage, +24 V DC: 32 V DC Potential difference to input voltage, ground: -32 V DC
Power consumption	Max. 7.2 W at 24 V DC; 24.6 Btu (IT)/h
Current overload protection at input	Non-changeable fuse
Dimensions (W x H x D)	46 mm x 131 mm x 111 mm
Weight	340 g
Ambient temperature	Ambient air 0ºC to +55ºC
Storage temperature	Ambient air -40ºC to +80ºC
Relative humidity	10% to 95% (non-condensing)
Atmospheric pressure	Suitable for operation up to 2000 m (795 hPa)
Pollution degree	2
EMC anti-interference level	Discharge of static electricity Contact discharge: EN 61000-4-2: test level 3 Air discharge: EN 61000-4-2: test level 3 Electromagnetic fields: EN 61000-4-3: test level 3 Fast transients: EN 61000-4-4: test level 3 Symmetrical surge voltage: EN 61000-4-5: test level 2 Asymmetrical surge voltage: EN 61000-4-5: test level 3 Cable-based RF faults: EN 61000-4-6: test level 3

EAGLE mGuard	
EMC emitted immunity	EN 55022: Class A FCC 47 CFR Part 15: Class A Germanischer Lloyd: Rules for Classification and Construction VI-7-3, part 1, Ed.2003
Resistance	Vibration EC 60068-2-6 Test FC: Test level according to IEC 61131-2 E2 CDV and Germanischer Lloyd: Guidelines for the Performance of Type Tests, Part 1 Shock EC 60068-2-27 Test EA: Test level according to IEC 61131-2 E2 CDV
Certifications	Complies with cUL 508 / CSA 22.2 No.142 cUL 1604 / CSA 22.2 No.213 pending Complies with Germanischer Lloyd standards